वार्षिक रिपोर्ट
ANNUAL REPORT
2004-2005

केन्द्रीय जल आयोग
CENTRAL WATER COMMISSION

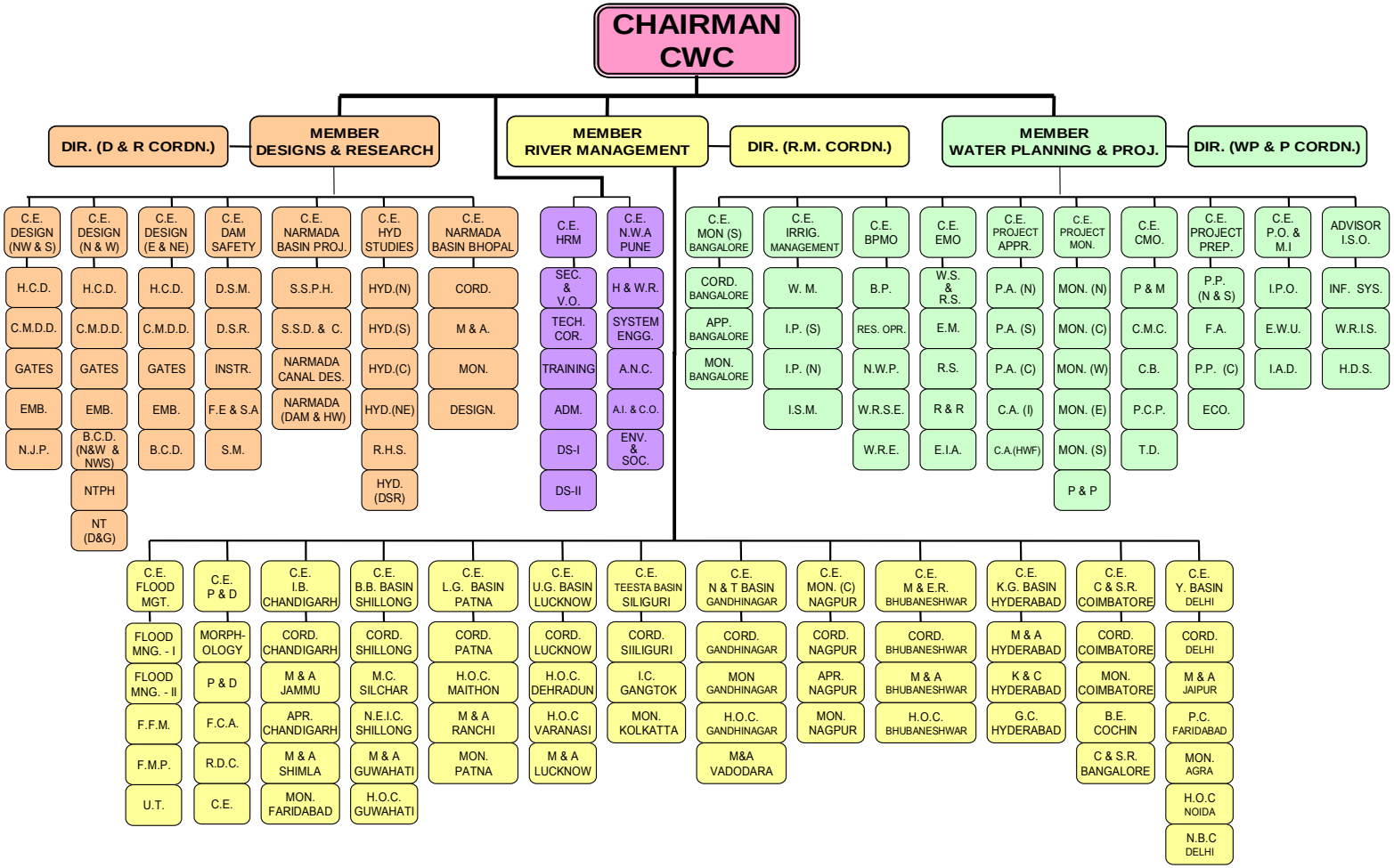
INDIA – LAND AND WATER RESOURCES : FACTS

•	GEOGRAPHICAL AREA LOCATION	329 M ha. Latitude 8^0 –4' & 37^0-06' North Longitude 68^0 – 7' & 97^0 – 25' East
•	POPULATION 2001 CENSUS ESTIMATED	1027 Million
•	RAINFALL VARIATION	100 mm in Western most regions to 11000 mm in Eastern most region
•	MAJOR RIVER BASIN (CATCHMENT AREA MORE THAN 20,000 SQ.KM.)	12 Nos. having catchment area 253 M ha.
•	MEDIUM RIVER BASIN (CATCHMENT AREA BETWEEN 2000 AND 20,000 SQ.KM.)	46 nos. having catchments area 25 M ha.
•	TOTAL NAVIGABLE LENGTH OF IMPORTANT RIVERS	14464 Km.
WATER RESOURCES		
•	AVERAGE ANNUAL RAINFALL (1998-2002)	3693.59 BCM
•	MEAN ANNUAL NATURAL RUN-OFF	1869 BCM
•	ESTIMATED UTILISABLE SURFACE WATER POTENTIAL	690 BCM
•	TOTAL REPLENISHABLE GROUND WATER RESOURCES	432 BCM
•	GROUND WATER RESOURCES AVAILABLE FOR IRRIGATION	360 BCM
•	GROUND WATER POTENTIAL AVAILABLE FOR DOMESTIC INDUSTRIAL AND OTHER PURPOSES	71 BCM (approx)
•	ULTIMATE IRRIGATION POTENTIAL	140 M ha.
•	IRRIGATION POTENTIAL FROM SURFACE WATER	76 M ha.
•	IRRIGATION POTENTIAL FROM GROUND WATER	64 M ha.
•	STORAGE AVAILABLE DUE TO COMPLETED MAJOR & MEDIUM PROJECTS (INCLUDING LIVE CAPACITY LESS THAN 10 M.CUM)	213 BCM
•	ESTIMATED ADDITIONAL LIKELY LIVE STORAGE AVAILABLE DUE TO PROJECTS UNDER CONSTRUCTION / CONSIDERATION	184 BCM
LAND RESOURCES (2000-01)		
•	TOTAL CULTIVABLE LAND	183.1 M ha.
•	GROSS SOWN AREA	187.0 M ha.
•	NET SOWN AREA	141.1 M ha.
•	GROSS IRRIGATED AREA	75.1 M ha.
•	NET IRRIGATED AREA	54.7 M ha.
HYDROPOWER		
•	ULTIMATE HYDROPOWER POTENTIAL (ESTIMATED)	84044 M.W. at 60% L.F.
•	POTENTIAL DEVELOPMENT BY 1ST APRIL, 2005	15225 M.W. at 60% L.F.

Government of India
Central Water Commission

ANNUAL REPORT

2004 - 2005


CHAIRMAN CWC
DIR. (D & R CORDN.)
MEMBER DESIGNS & RESEARCH
MEMBER RIVER MANAGEMENT
DIR. (R.M. CORDN.)
MEMBER WATER PLANNING & PROJ.
DIR. (WP & P CORDN.)
C.E. DESIGN (NW & S)
H.C.D.
C.M.D.D.
GATES
EMB.
N.J.P.
C.E. DESIGN (N & W)
H.C.D.
C.M.D.D.
GATES
EMB.
B.C.D. (N&W & NWS)
NTPH
NT (D&G)
C.E. DESIGN (E & NE)
H.C.D.
C.M.D.D.
GATES
EMB.
B.C.D.
C.E. DAM SAFETY
D.S.M.
D.S.R.
INSTR.
F.E & S.A
S.M.
C.E. NARMADA BASIN PROJ.
S.S.P.H.
S.S.D. & C.
NARMADA CANAL DES.
NARMADA (DAM & HW)
C.E. HYD STUDIES
HYD.(N)
HYD.(S)
HYD.(C)
HYD.(NE)
R.H.S.
HYD. (DSR)
C.E. NARMADA BASIN BHOPAL
CORD.
M & A.
MON.
DESIGN.
C.E. HRM
SEC. & V.O.
TECH. COR.
TRAINING
ADM.
DS-I
DS-II
C.E. N.W.A PUNE
H & W.R.
SYSTEM ENGG.
A.N.C.
A.I. & C.O.
ENV. & SOC.
C.E. MON (S) BANGALORE
CORD. BANGALORE
APP. BANGALORE
MON. BANGALORE
C.E. IRRIG. MANAGEMENT
W. M.
I.P. (S)
I.P. (N)
I.S.M.
C.E. BPMO
B.P.
RES. OPR.
N.W.P.
W.R.S.E.
W.R.E.
C.E. EMO
W.S. & R.S.
E.M.
R.S.
R & R
E.I.A.
C.E. PROJECT APPR.
P.A. (N)
P.A. (S)
P.A. (C)
C.A. (I)
C.A.(HWF)
C.E. PROJECT MON.
MON. (N)
MON. (C)
MON. (W)
MON. (E)
MON. (S)
P & P
C.E. CMO.
P & M
C.M.C.
C.B.
P.C.P.
T.D.
C.E. PROJECT PREP.
P.P. (N & S)
F.A.
P.P. (C)
ECO.
C.E. P.O. & M.I
I.P.O.
E.W.U.
I.A.D.
ADVISOR I.S.O.
INF. SYS.
W.R.I.S.
H.D.S.
C.E. FLOOD MGT.
FLOOD MNG. - I
FLOOD MNG. - II
F.F.M.
F.M.P.
U.T.
C.E. P & D
MORPH-OLOGY
P & D
F.C.A.
R.D.C.
C.E.
C.E. I.B. CHANDIGARH
CORD. CHANDIGARH
M & A JAMMU
APR. CHANDIGARH
M & A SHIMLA
MON. FARIDABAD
C.E. B.B. BASIN SHILLONG
CORD. SHILLONG
M.C. SILCHAR
N.E.I.C. SHILLONG
M & A GUWAHATI
H.O.C. GUWAHATI
C.E. L.G. BASIN PATNA
CORD. PATNA
H.O.C. MAITHON
M & A RANCHI
MON. PATNA
C.E. U.G. BASIN LUCKNOW
CORD. LUCKNOW
H.O.C. DEHRADUN
H.O.C VARANASI
M & A LUCKNOW
C.E. TEESTA BASIN SILIGURI
CORD. SIILIGURI
I.C. GANGTOK
MON. KOLKATTA
C.E. N & T BASIN GANDHINAGAR
CORD. GANDHINAGAR
MON GANDHINAGAR
H.O.C. GANDHINAGAR
M&A VADODARA
C.E. MON. (C) NAGPUR
CORD. NAGPUR
APR. NAGPUR
MON. NAGPUR
C.E. M & E.R. BHUBANESHWAR
CORD. BHUBANESHWAR
M & A BHUBANESHWAR
H.O.C. BHUBANESHWAR
C.E. K.G. BASIN HYDERABAD
M & A HYDERABAD
K & C HYDERABAD
G.C. HYDERABAD
C.E. C & S.R. COIMBATORE
CORD. COIMBATORE
MON. COIMBATORE
B.E. COCHIN
C & S.R. BANGALORE
C.E. Y. BASIN DELHI
CORD. DELHI
M & A JAIPUR
P.C. FARIDABAD
MON. AGRA
H.O.C NOIDA
N.B.C DELHI

From Chairman's Desk

It gives me great pleasure in presenting the Annual Report for the year 2004–05 depicting the activities and achievements of Central Water Commission (CWC), the premier Technical Organisation in Water Resources Sector. This Report will provide an insight into the functions and activities of this organization and the contribution it has made in the development and management of Water Resources.

CWC continued to forge ahead in providing the necessary leadership and guidance for the development of the water sector and provided necessary support to the Ministry of Water Resources on all technical and policy matters in the year 2004-05. Officers of CWC headed several committees and contributed substantially on various issues. CWC provided technical assistance to the Ministry in respect of Baglihar and other projects of Indus basin in respect of issues under Indus Water Treaty provisions. Similarly, CWC was involved in the study of landslide dam at Parechu in China, which would have caused serious flooding problem downstream on Indian side in the event of its sudden failure. Regular activities of appraisal of major and medium irrigation projects and other water resources development schemes, monitoring of major, medium and extension/renovation/modernization (ERM) projects/environmental issues related to projects, design of hydraulic structures, hydrological observation and studies and flood forecasting services were successfully carried out during the year. Some of the important achievements of the Central Water Commission during this period are:

Related to Consultancy & Advisory Services

1. Studies in respect of DPR of Pancheshwar Multipurpose Project – a joint project with Nepal.
2. Design Consultancy in respect of 100 Water Resources Development projects in India and neighbouring countries.
3. Joint investigation of Sapta Kosi High Dam and Sun Kosi Storage-cum-Diversion Dam taken up through Indo-Nepal Joint Project Office (JPO).

Related to Monitoring & Appraisal of Water Resources Projects

4. Four Hydropower projects (1224 MW) and seven thermal power projects (6100 MW) were cleared by CWC, which were finally accorded TEC by CEA.
5. Monitoring of 88 Major, 38 Medium and 9 ERM Projects and CAD works of 133 projects.
6. Examination of proposals for release of Rs. 2773.13 crore of CLA under AIBP programme and monitoring of 81 projects.
7. Field offices were effectively involved in the examination of proposals under the scheme for restoration and revival of water bodies.

Related to Flood Management

8. Accurate and timely issue of 4889 flood forecasts (with 96.05% accuracy) during the monsoon period of 2004 to help in effective flood management, particularly in Assam, Bihar, Orissa and Uttar Pradesh, which faced severe floods.
9. Task Force Report on Flood Management and Erosion Control in view of unprecedented floods in Assam, Bihar and Eastern UP, prepared in four months time.

(R. JEYASEELAN)
CHAIRMAN
CENTRAL WATER COMMISSION

HIGHLIGHTS OF THE YEAR 2004-05

- **DESIGNS:**
  - Design unit of CWC undertook detailed designs and drawings of various types of hydraulic structures for 100 water resources development projects.
  - Upgradation of available technical softwares and hardware capabilities and enhancement of design capabilities of CWC Engineers through training was taken up.

- **RIVER MANAGEMENT:**
  - Carried out Hydrological Observations at 945 sites spread over the country.
  - Operated 172 flood forecasting stations (including 27 inflow forecasting sites) spread over 9 major river basins. 4889 flood forecasts were issued of which 96.05 % were within prescribed limits of accuracy. Daily flood bulletins and weekly flood news letters were issued during the flood season.
  - Provided assistance for maintenance of 35 Hydro-meteorological sites in Bhutan and 42 meteorological / hydrometric sites in Nepal.
  - 11 Projects were under investigation in North-Eastern region.
  - Detailed Project Report (DPR) of Sesseri Multipurpose Project in Arunachal Pradesh has been submitted and DPR of Kirthai H.E. Project Stage-II in J&K, Nyukcharang Chu H.E. Project in Arunachal Pradesh and Joint DPR of Pancheshwar Multipurpose Project in Nepal were under preparation.
  - 57 Minor Irrigation Schemes were under investigation in Mizoram. DPR for 28 schemes have been submitted and investigation work/ preparation of reports in respect of balance 29 schemes was under process.
  - 65 Flood Management Schemes/Master Plans were apprised/cleared.
  - In view of unprecedented floods in Assam, Bihar, Eastern Uttar Pradesh and West Bengal, Ministry of Water Resources constituted a Task Force on “Flood Management / Erosion Control” in August, 2004 under the chairmanship of the Chairman, CWC. The Task Force undertook a detailed study of the problem and submitted its report to the Government on 31-12-2004 as per schedule.
  - As per the directions from PMO, an Inter-Ministerial sub-group was constituted under Member (RM) CWC for establishing a cohesive, self contained entity in the North East Region for Water Resources Development. Sub-group after having detailed consultations with the concerned state Governments, Central Ministries and Departments submitted its report on the constitution of “North East Water Resources Authority”.

- **WATER PLANNING:**
  - 44 new Major Irrigation Projects & 16 revised Major Irrigation Projects and 57 new Medium Irrigation Projects were under appraisal in CWC.
  - Monitored 135 Major, Medium and extension/renovation/modernization (ERM) funded by CLA under AIBP and 133 CAD projects.
  - 71 important reservoirs with total live storage of 131.28 BCM were monitored on weekly basis.
  - Central Loan Assistance (CLA) of Rs. 2173.13 crore was recommended for release to 81 projects under Accelerated Irrigation Benefit Programme (AIBP).
  - Provided technical assistance to Ministry of Water Resources in respect of the inter-state water disputes such as Cauvery Water Dispute and the Ravi-Beas Water Dispute.

- **HRM:**
  - 293 in service officers were sponsored for training, attending seminars/ workshops etc. in India which were organised by other organisations and 16 officers participated in various programmes aboard.

C O N T E N T S

CHAPTER-I

INTRODUCTION

1.1 History of CWC

Central Water Commission (CWC), an apex organization in the country in the field of Water Resources came into existence as "Central Waterways, Irrigation and Navigation Commission" vide Department of Labour Resolution No. DW 101(2) dated 5.4.1945. In the year 1951, it was renamed as "Central Water and Power Commission" (CW&PC) after its merger with the "Central Electricity Commission". Following the changes in the Ministry of Agriculture and Irrigation, in the year 1974, water wing of CW&PC was separated as "Central Water Commission", which continues till date. At present Central Water Commission functions as an "Attached Office" of the Ministry of Water Resources and is its main technical arm. It is manned by the Central Water Engineering Services (CWES) cadre, the only organised service of the Ministry of Water Resources.

1.2 Organisation

Central Water Commission is headed by a Chairman, with the status of Ex-Officio Secretary to the Government of India. The work of the Commission is divided among 3 wings namely, Designs and Research Wing (D&R), Water Planning and Projects Wing (WP&P) and River Management Wing (RM). Allied functions are grouped under respective wings and each wing is placed under the charge of a full-time Member with the status of Ex-Officio Additional Secretary to the Government of India. Each wing comprising of number of Organizations is responsible for the disposal of tasks and duties falling within the scope of functions assigned to it. In the discharge of these responsibilities, officers of the rank of Chief Engineer, Director/Superintending Engineer, Deputy Director/Executive Engineer, Assistant Director/Assistant Executive Engineer and other Engineering and Non-Engineering officers and supporting staff working in various field and HQ organizations, assist the Members. There is a separate Human Resources Management Unit headed by a Chief Engineer, to deal with Human Resources Management/Development, Financial Management, Training and Administrative matters of the Central Water Commission. National Water Academy located at Pune is responsible for training of Central and State in-service engineers and it functions directly under the guidance of Chairman. Broad functional areas of Chairman and Members are:-

Chairman

Head of the Organization – Responsible for overseeing the various activities related to overall planning and development of surface water resources of the country.

Member (Water Planning & Projects)

Responsible for overall planning and development of river basins, national perspective plan for water resources development in accordance with the National Water Policy, techno-economic appraisal of Water Resources Projects and assistance to the States in the formulation and implementation of projects, monitoring of selected projects for identification of bottlenecks to achieve the targeted benefits, preparation of project reports for seeking international assistance, environmental aspects, issues related to construction machinery of projects, application of remote sensing technologies in water resources etc.

Member (Designs & Research)

Responsible for providing guidance and support in planning, feasibility studies, standardization and designs of river valley projects in the country, safety aspects of major and

medium dams, hydrological studies for the projects, coordination of research activities etc.

Member (River Management)

Responsible for providing technical guidance in matters relating to river morphology, flood management, techno-economic evaluation of flood management schemes, collection of hydrological and hydro-meteorological data, formulation of flood forecast on all major flood prone rivers and inflow forecasts for selected important reservoirs, investigation of irrigation/hydro-electric/multipurpose projects, monitoring of major and medium projects with regard to Command Area Development etc.

The incumbents of the posts of Chairman, Central Water Commission and Members during the year 2004-05 were:

1.	Chairman, CWC	:	Shri R. Jeyaseelan
2.	Member (WP&P)	:	Shri C.B. Vashista
3.	Member (D&R)	:	Shri S.K. Das
4.	Member (RM)	:	Shri M.K. Sharma

1.3 Broad Functions

CWC is charged with the general responsibility of initiating, coordinating and furthering in consultation with the State Governments concerned, schemes for the control, conservation and utilization of water resources in the respective state for the purpose of flood management, irrigation, navigation, drinking water supply and water power generation. The Commission, if so required, can undertake the construction and execution of any such scheme.

In exercise of the above responsibilities following are the main functions of CWC:

- To undertake necessary surveys and investigations as and when so required, to prepare designs and schemes for the development of river valleys in respect of power generation, irrigation by gravity flow or lift, flood management, environmental management, rehabilitation and resettlement, soil conservation, anti-water logging measures, reclamation of alkaline and saline soils, drainage and drinking water supply;

- To undertake construction work of any river valley development scheme on behalf of the Government of India or State Government concerned;

- To advise and assist, when so required, the State Governments (Commissions, Corporations or Boards that are set up) in the investigation, surveys and preparation of river valley and power development schemes for particular areas and regions;

- To advise the Government of India in respect of Water Resources Development, regarding rights and disputes between different States which affect any scheme for the conservation and utilization and any matter that may be referred to the Commission in connection with river valley development;

- To advise the Government of India and the concerned State Governments on the basin-wise development of water resources;

- To advise the Government of India on all matters relating to the Inter-State water disputes;

- To collect, coordinate the collection of, publish and analyse the data relating to tidal rivers, rainfall, runoff and temperature, silting of reservoirs, behaviour of hydraulic structures, environmental aspects etc. and to act as the central bureau of information in respect of these matters;

- To collect, maintain and publish statistical data relating to water resources and its utilization including quality of water throughout India and to act as the central bureau of information relating to water resources;

- To initiate schemes and arrange for the training of Indian Engineers in India and abroad in all aspects of river valley development;

- To standardize instruments, methods of observation and record, materials for construction, design and operation of irrigation projects;

- To initiate studies on socio-agro-economic and ecological aspects of irrigation projects for the sustained development of irrigation;

- To conduct and coordinate research on the various aspects of river valley development schemes such as flood management, irrigation, navigation, water power development etc., and the connected structural and design features;

- To promote modern data collection techniques such as remote sensing technology for water resources development, river forecasting and development of computer softwares;

- To conduct studies on dam safety aspects for the existing and future dams and standardize the instruments for dam safety measures;

- To initiate morphological studies to visualise river behaviour, bank erosion/coastal erosion problems and advise the Central and State Governments on all such matters;

- To conduct experiments, research and to carry out such other activities to promote economic and optimum utilization of water resources; and

- To promote and create mass awareness in the progress and achievements made by the country in the water resources development, use and conservation.

1.4 Headquarters

There are eighteen organisations headed by Chief Engineer at CWC headquarters, New Delhi. Out of which nine organisations are under WP&P wing viz. Basin Planning & Management, Central Mechanical, Environmental Management, Irrigation Management, Performance Overview and Management Improvement, Project Appraisal, Project Preparation, Project Monitoring and Information Systems Organisations; six organisations are under D&R wing viz. Design (NW&S), Design (N&W), Design (E&NE), Hydrological Studies, Dam Safety and Narmada Basin Projects organisatins; two organisations are under RM wing viz. Flood Management and Planning & Development organisations. In addition, Human Resources Management (HRM) Unit headed by Chief Engineer (HRM) dealing with establishment, administration and Training matters is also located at headquarters.

1.5 Regional Offices

In order to achieve better results in the Water Resources Sector and have better coordination with the State Government departments, CWC has established regional offices. It has 13 regional offices, each headed by a Chief Engineer. The offices are located at Bangalore,

Bhopal, Bhubaneswar, Chandigarh, Coimbatore, Delhi, Hyderabad, Lucknow, Nagpur, Patna, Shillong, Siliguri and Gandhi Nagar. In addition, for training of Central and State in-service engineers, CWC also has a National Water Academy located at Pune.

1.6 Personnel Management

The staff strength of CWC in position as on 31.12.2004 was 4363 as against the sanctioned posts of 5302. The details of posts (sanctioned and filled) at the headquarters and at the field offices are given in Table 1.1. Summary of sanctioned and filled posts in different groups is given in Table 1.2.

Table 1.1
Staff Strength

Category	Sanctioned	Filled
Headquarters	2034	} 4363
Field	3268	}
Total	**5302**	**4363**

Table 1.2
Group-Wise Details of Posts Sanctioned and Filled

Sl. No.	Category	Sanctioned	Filled
1.	Group "A"	699	605
2.	Group "B"	485	449
	Group "B" (Non-Gazetted)	508	363
3.	Group "C"	2571	2072
4.	Group "D"	1039	874
	Total	**5302**	**4363**

1.7 Plan Schemes & Annual Budget

1.7.1 Plan Schemes

Details of the Plan Schemes under operation during the year in CWC are given below:

(Amount in Rs. Crore)

Sl. No.	Name of Scheme	X plan outlay	2004-05			Total Exp. During X Plan upto Mar, 05	Broad Objective
			BE	FE	Actual Exp.		
1	***2***	**3**	**4**	**5**	**6**	**7**	**8**
1.	National water Academy	10.00	2.5	2.239	2.1809	4.3809	Conducting training courses for Central and State Government officials
2.	Snow Hydrological Studies	2.00	0.40	0.328	0.2994	0.8794	Collection of Snowmelt run-off data and preparation of snowmelt run-off Model.
3.	Monitoring of Water Quality in rivers of India	7.50	1.30	1.305	0.9998	2.8498	Collection of Hydro-Meteorological data on quantity and quality of water resources from 945 hydrological observation stations

1	*2*	3	4	5	6	7	8
4.	Hydrological Observations on Rivers originating from Bhutan	1.50	0.23	0.803	0.7966	1.2066	Collection of Hydrological data for rivers flowing to India through Bhutan and communication of real time data
5.	Strengthening of Monitoring Organization	19.00	3.53	3.420	3.255	9.015	Monitoring and Appraisal of major/medium/ERM irrigation schemes under AIBP/non-AIBP, CAD Schemes and Renovation of Water bodies
6.	Kirthai & Other Projects in Indus Basin	7.00	1.61	1.569	1.5263	3.6963	Survey & Investigation and preparation of Detailed Project Reports
7.	Estt/Maintenance of Key Hydrological Stations on rivers other than Ganga and Indus	40.00	8.00	8.926	8.7498	23.2398	Running & Maintenance of 111 Key HO sites and collection of Hydro-meteorological data in rivers other than Ganga and Indus
8.	Investigation for Water Resources Development in N.E States	5.28	1.86	1.63	1.6124	4.8824	Survey & Investigation of 57 M.I Schemes in Mizoram and Inv. of 14 H.E Projects in Arunachal Pradesh
9.	Investigation of Teesta Hydel Project, Rangit H.E. Project Stage II & IV and Manas Teesta Link	9.00	2.50	2.485	2.3643	7.3343	Survey & Investigation and preparation of Detailed Project Reports
10.	Flood Forecasting on rivers Common to India & Nepal	3.00	0.28	0.053	0.0517	0.1217	R&M of 37 G&D and Meteorological sites in Nepal
11.	Strengthening and Modernization of FF & H.O Network in Brahmaputra & Barak Basin	14.00	3.00	3.398	3.1738	8.8138	R&M of 39 HO&FF sites in Brahmaputra and Barak Basin
12.	Hydrology Project Stage	15.13	0.60	0	0	14.2400	Hydrology Project Stage II yet to be sanctioned.
13.	Establishment & Modernization of F.F Network in India including Inflow Forecast	51.00	6.00	5.794	5.5198	14.4498	Modernization of 172 FF Sites by installing telemetry system etc.
14.	Capital Outlay for Flood Control Projects	25.00	5.00	5.950	5.89	11.1100	Construction of residential & non-residential buildings for CWC fields offices
15.	Pancheshwar Multipurpose Project	15.00	2.400	1.670	1.4853	8.1253	Preparation of DPR of Pancheshwar Multipurpose Project, R&M of 31 HO and Meteorological sites
16.	Survey and Investigation of Kosi High Dam	30.00	6.00	3.403	1.9817	1.990	Survey & Investigation and preparation of Detailed Project Reports. Joint Project Office (JPO) opened on 17-08-04.

1	2	3	4	5	6	7	8
17.	Upgradation of facilities and skills in CWC regarding Dam Safety and Rehabilitation	8.00	2.00	1.27	0.4313	1.0113	Establishment of two units on dam Break Modelling and Emergency Action Plan.
18.	Upgradation and Modernisation of Computerisation/Information System	8.00	3.20	1.626	1.4026	5.1126	Upgrading CWC's networking, publication unit and library, procurement of hardware and software & maintenance.
19.	Setting up of specialized units for HE Designs, Pumped Storage and Instrumentation	3.00	1.00	0.220	0.1637	0.3637	Setting up of instrumentation museum and training of personnel in specialised subjects.
20.	Studies on Reservoir Sedimentation and other Remote Sensing Applications	14.00	4.00	3.224	1.8182	4.7482	• Reservoir Sedimentation, River Morphological and Assessment of Waterlogged and Salinity and/or Alkalinity affected areas in Irrigated Commands through out India using Remote Sensing Techniques. • Reservoir Sedimentation studies using Hydrographic Techniques • Morphological studies of 6 rivers.

1.7.2 Annual Budget

The plan and non-plan budget outlays and expenditure for the year 2004-2005 are given in Table 1.3.

Table 1.3
Plan and Non-Plan Outlay and Expenditure on Schemes

Sl. No.	Name of Scheme	Plan		Non-Plan	
		Outlay	Expenditure	Outlay	Expenditure
1.	Direction & Administration	-	-	11.35	12.15
2.	Consultancy	-	-	13.31	14.14
3.	Research	-	-	1.07	0.94
4.	Training	1.50	1.18	0.51	0.38
5.	Data Collection	8.00	8.75	37.59	41.79
6.	Survey & Investigation	-	-	5.54	4.93
7.	Other - Major and Medium Irrigation	20.13	13.30	3.08	2.87
	- Flood Control	19.78	18.13	31.11	34.08
	Total	**49.41**	**41.36**	**103.56**	**111.28**

1.8 Consultancy Services

The Designs & Research Wing and the investigation circles of CWC have been providing consultancy to Central Departments, State Governments and Public Sector Organisations in Planning, Surveys & Investigation and Design of river valley projects in India and abroad.

1.9 Progressive Use of Hindi in Official Work

The Official Language policy is being implemented in all offices under the administrative control of the Central Water Commission. Continued measures were taken for progressive use of Hindi for official purpose. The Official Language Implementation Committee of the Commission meets regularly under the Chairmanship of the Member (D&R). Various measures required for progressive use of Hindi are discussed and timely action is taken on the decisions taken in the meetings. Sufficient progress has been made in the implementation of the Raj Basha Act in the Commission. Following initiatives with regard to progressive use of Hindi were taken during the year 2004-05:

1. "Hindi Fortnight" was organized in September 2004. During this fortnight various competitions like Hindi noting/drafting, essay writing, administrative articles, kavya spardha, technical article writing were organized and winners were awarded prizes. "Raj Bhasha Chal Shields" for the year 2003-2004 were awarded to Chambal Division, Jaipur, Tapi Division, Surat, North East Investigation Division-3, Itanagar, Esst.I section and Environment Management Directorate for doing maximum work in Hindi during the year.
2. Four officers were nominated for Hindi training. A total five officials were nominated for Hindi typing while 11 were nominated for Hindi stenography.
3. With a view to review the progressive use of Hindi and also to keep a watch on the compliance of Orders, instructions etc., field offices located at Lucknow, Faridabad, Jammu, Baroda, Pune, Guwahati and Shillong were inspected. Effective steps were taken for rectifying shortcomings noticed during the inspections.
4. To generate awareness about Hindi, and to give practical knowledge of the Provisions under Official Language and incentive schemes etc., Hindi workshops were organized in Jammu, Pune and in CWC (HQ).
5. Apart from translation of documents falling under section 3(3) of the Official Language (OL) Act, the Annual Report of the CWC 2003-04 was translated.

1.10 Reservation for SC, ST & OBC

The representation of SC, ST & OBC officials in different grades is given in Table 1.4.

Table 1.4
Representation of SC & ST Officials in Different Grades

(as on 31-12-2004)

Category	No. of Filled posts	No. of SCs	No. of STs	No. of OBCs
Group A	605	63	17	19
Group B	449	68	9	-
Group B (Non Gazetted)	363	73	11	2
Group C	2072	232	62	74
Group D	874	252	87	42
Total	**4363**	**688**	**186**	**137**

1.11 Status of Filling up of Vacancies Reserved for Disabled Persons

Section 33 of the Persons with Disabilities (Equal Opportunities Protection of Rights and Full Participation) Act 1995 provides that Government shall appoint in every establishment such percentage of vacancies, not less than 3% for persons or class of persons with disabilities of which 1% each shall be reserved for persons suffering from (i) blindness or low vision (ii) hearing impairment and (iii) locomotor disabilities or cerebral palsy in the posts identified for each disability. In pursuance of this, posts for disabled persons have been identified.

The position of Disabled Persons in position as on 31.12.2004 is given in Table 1.5. Efforts are being made to fill up the backlog vacancies.

Table 1.5
Number of Disabled Persons in Position as on 31.12.2004

GROUP	TOTAL	OH	VH	HH
'A'	2	2	-	-
'B'	6	5	-	1
'C'	10	9	1	-
'D'	9	3	4	2
Total	**27**	**19**	**5**	**3**

OH – Orthopaedic Handicapped *VH – Visually Handicapped*
HH – Hearing Handicapped

1.12 Welfare Measures and Incentives

The different welfare measures and incentives that are in existence include:

1. Benevolent Fund to provide immediate financial assistance;
2. Co-operative Thrift and Credit Society to meet the financial needs and to cultivate the thrift habit;
3. Encouragement to sports personnel by providing prizes and other amenities;
4. Timely redressal of grievances.

Summary of activities under the welfare schemes are given below:

1.12.1 Benevolent Fund : The Central Water Commission Benevolent Fund set up in 1966 aims at providing prompt financial assistance to the deserving members to take care of damages at the time of natural calamities or to meet expenses of medical treatment for their own prolonged illness such as Cancer, TB, etc. and surviving family members of those who died while in service. The financial assistance is provided in two ways:

- Immediate Relief upto Rs. 10,000/-
- Long Term Relief upto Rs. 8,000/- payable in eight monthly instalments.

The administration of the fund vests in the Governing Body, which comprises of a Chairman, one Honorary Secretary, one Treasurer and 8 Members. The audited accounts are placed before the General Body in the Annual General Body meeting. The existing subscription rate is Rs. 5/- (Five) per month. During the year 2004-05 there were seven cases of immediate relief and one case of long term relief approved by the Governing Body of the Benevolent Fund.

1.12.2 Co-Operative Thrift And Credit Society: Department of Irrigation Co-operative Thrift & Credit Society Ltd., has been functioning with its registered office at West Block – I, R.K. Puram, New Delhi since March 1959 for the welfare and benefit of the officers and staff of the Ministry of Water Resources, Central Water Commission, Central Soil & Materials Research Station, Department of Power, Central Electricity Authority, Principal Pay & Accounts Office of the Ministry of Water Resources and Pay & Accounts Office, Central Water Commission. It provides its member loans to the extent of Rs. 75,000/- and emergency loan of Rs. 5000/-, recoverable in 60 and 10 monthly instalments respectively at a rate of interest of 9% per annum. The Society pays gratuity for retiring members and writes off outstanding loans against deceased members from the members' welfare fund.

1.12.3 Sports and Cultural Activities

Number of CWC officials and staff participated in the Inter-ministry athletics and sports events and distinguished themselves with excellent performances. CWC Hockey Team was the runner-up of the Inter-ministry Hockey tournament. The CWC Team also participated in Inter-ministry music & dance competition and won a prize.

1.12.4 Setting Up of Liaison Cell for SC/ST/OBC/Handicapped Persons

A Liaison Cell for SC/ST/OBC/Handicapped Persons has been set up in CWC to look after their welfare.

1.13 Restructuring of Central Water Commission

The National Commission for Integrated Water Resources Development Plan (NCIWRDP) set up to study the development and management of National Water Resources in a professional manner, under the Chairmanship of Dr. S.R. Hashim, the then Member, Planning Commission in its report has, inter-alia, recommended that the "entire question of restructuring of the Central Water Commission may be got studied in detail by appointing competent consultants." The major recommendations of the Hashim Report are:

- CWC to be restructured as a Statutory High Powered Commission, initially by an executive order and simultaneously by making suitable provisions in the new law on interstate rivers.
- CWC should be vested with executive Powers to control national water management works.
- With powers to establish innovative organizational structure for specific purposes.
- Chairman of the commission should actually function as Secretary to GOI in certain delineated responsibilities.
- The Commission may have 6 full time Members.
- The link of CGWB to CWC needs to be specifically looked into for coordinated functions for water resources development.

Accordingly, the Ministry of Water Resources has awarded the Consultancy for the above studies to the Administrative Staff College of India, Hyderabad. The terms of reference of the study include (i) the evaluation of present status of Central Water Commission and its functions; (ii) future projections in the Water Sector for 2025; (iii) Mission for Central Water Commission in respect of the future projections for 2025; and the organizational structure and related issues in respect of CWC to enable it in achieving the Mission. This study is in progress.

CHAPTER-II

WATER RESOURCES DEVELOPMENT

2.1 Water Resources in India

Central Water Commission (CWC) has been making periodical assessment of the Country's Water Resources. The water resources potential of the country, which occurs as a natural runoff in the rivers is about 1869 Billion Cubic Metres (BCM). It constitutes a little over 4% of the total river flows of the world. However, due to various constraints of topography and uneven distribution over space and time, only about 1122 BCM, of the total annual water potential can be put to beneficial use. This can be achieved through 690 BCM, utilizable surface water and 432 BCM through ground water. In majority of river basins, present utilisation is significantly high and is in the range of 50% to 95% of utilizable surface resources. In some of the river basins like Narmada and Mahanadi, the utilisation is quite low.

While water for drinking purpose has been accorded topmost priority in water use, irrigation is the major consumer of water. Ultimate irrigation potential which can be created making use of the utilizable surface water resources through major, medium and minor projects would be about 75.9 m.ha. Irrigation potential making use of ground water has now been assessed as 64 m.ha. Thus the total irrigation potential from surface and ground water sources would be about 139.9 m.ha. Besides this, the additional irrigation potential of about 35 m.ha. can be created by taking up long distance inter basin transfer of water from surplus to deficit basins. Water Resources potential in the major river basins is given in Table 2.1.

In order to appropriately address the present and future water and food grain requirements of the society within the available financial resources, following thrust/priority areas for water resources related issues have been identified by MoWR/PMO:

- Improving water utilization efficiency;
- Command area development and participatory irrigation management;
- Flood management and erosion control;
- Protection of costal erosion;
- Dam safety and rehabilitation;
- Revival and restoration of existing water bodies;
- Appropriate regulation and management of groundwater;
- Ground water recharge;
- Pursue the agenda for Inter-linking of rivers, starting with the south-bound rivers;
- Rural drinking water supply and sanitation;

Central water Commission is directly and indirectly contributing in achieving the objectives of these thrust/priority areas.

2.2 Highlights of Water Resources Sector

As the variability of rainfall over the country is well known, the development of water resources for irrigated agriculture received high priority in the different plan periods. Expansion of irrigation facilities, along with consolidation of the existing systems, has been the main strategy for increasing production of food grains. Irrigation support is provided through major, medium and minor irrigation projects and command area development. With sustained and systematic development of irrigation, the irrigation potential has increased from 22.6 million hectare (mha) in

1951, when the process of planning began in India, to about 93.98 mha at the end of IX Plan. Irrigation potential created upto March, 2005 is 99.36 m.ha.

Table 2.1
Water Resources Potential in the Major River Basins of India

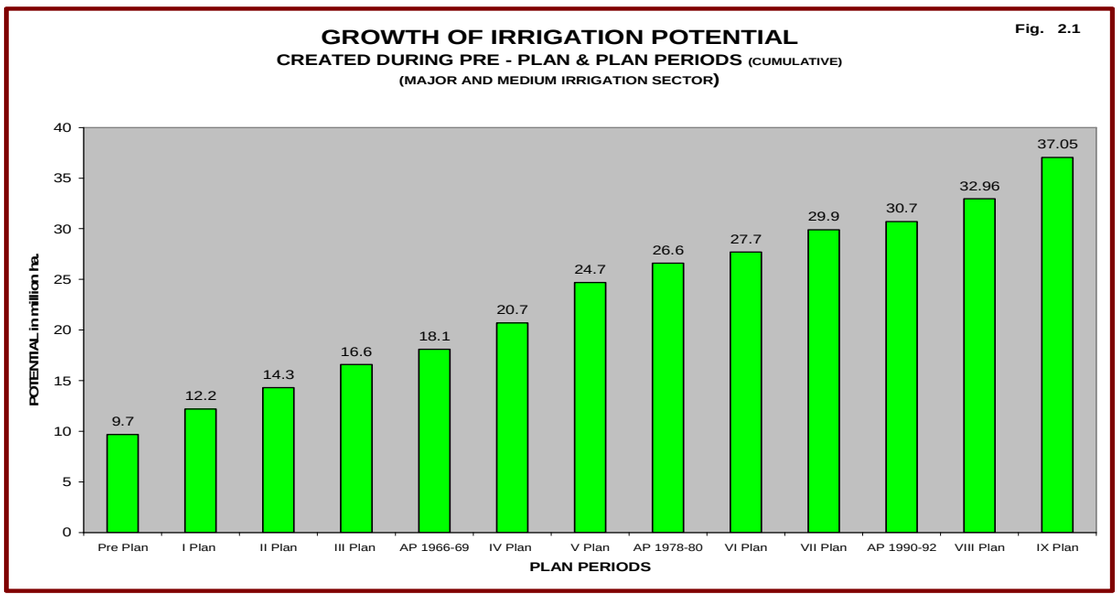
Unit: BCM

Sl. No.	Name of the River Basin	Average Annual Potential in the River	Estimated Utilisable Flow (excluding Ground Water)
1.	Indus (upto Border)	73.31	46.00
2.	a) Ganga	525.02	250.00
	b) Brahmaputra, Barak and others	585.60	24.00
3.	Godavari	110.54	76.30
4	Krishna	78.12	58.00
5	Cauvery	21.36	19.00
6	Pennar	6.32	6.86
7	East flowing Rivers between Mahanadi & Pennar	22.52	13.11
8	East Flowing Rivers between Pennar and Kanayakumari	16.46	16.73
9	Mahanadi	66.88	49.99
10	Brahmani & Baitarni	28.48	18.30
11	Subarnarekha	13.37	6.81
12	Sabarmati	3.81	1.93
13	Mahi	11.02	3.10
14	West Flowing Rivers of Kutch, Saurashtra including Luni	15.10	14.98
15	Narmada	45.64	34.50
16	Tapi	14.88	14.50
17	West Flowing Rivers from Tapi to Tadri	87.41	11.94
18	West flowing rivers from Tadri to Kanyakumari	113.53	24.27
19	Area of Island drainage in Rajasthan Desert	Neg	-
	Minor River Basins drainage to Bangladesh & Myanmar	31.00	-
	Total	**1869.35**	**690.32**

Source: CWC Publication – Handbook on Water and Related Information, Jan, 2005

2.2.1 Irrigation Potential: Major & Medium Irrigation Sector

The ultimate irrigation potential of the country is estimated as 140 m.ha of which irrigation potential from major & medium irrigation projects is assessed as 58.5 m.ha. Irrigation potential in the country from major and medium irrigation projects, which stood at 9.7 m.ha in 1951, has risen to 37.05 M.ha. till the end of IX Plan. The cumulative figures of potential created in the successive plan periods are given in Figure 2.1.



2.2.2 Major and Medium Irrigation Projects

In 1951, during launching of the First Five Year Plan, there were 74 major and 143 medium irrigation projects in the country. During the plan period since 1951 to end of IX Plan in 2002, as per available information, 316 major, 995 medium and 172 ERM (Extension/ Renovation/ Modernization) schemes were taken up of which 154 major, 774 medium and 87 ERM projects have reportedly been completed. During X plan few additional projects were taken up and 4 major, 12 medium and 3 ERM projects were completed upto March, 2004 during X Plan. Status of projects taken up/completed since pre-plan period upto March, 2004 is given below in Table 2.2.

Table 2.2
Number of Major, Medium & ERM Projects taken up and Completed

Category	No. of Projects Taken upto IX Plan			No. of Projects completed upto IX Plan			Spill over into X Plan	Status as on 01-04-2005	
	Pre-plan	Plan	Total	Pre-plan	Plan	Total		Completed during X Plan upto March, 04	On-going
Major	74	314	390	74	154	228	162	4	169*
Medium	143	995	1138	143	774	917	221	12	219**
ERM	-	172	172	-	87	87	85	3	83#
Total	**217**	**1483**	**1700**	**217**	**1015**	**1232**	**468**	**19**	**471**

* - include 11 Major additional spillover projects of Maharashtra
** - include 11 Medium additional spillover projects of Maharashtra and 1 project of Goa abandoned
\# - include 2 ERM additional spillover projects of Maharashtra and 2 projects of Bihar merged into one project.

The cumulative irrigation potential created till the end of IX th Plan is 37.05 m.ha and target for Xth Plan is 9.93 m.ha. State wise cumulative potential created through major and

medium projects upto end of IXth Plan and target for Xth Plan are given in Table 2.3. Growth of irrigation potential created through Major and Medium Irrigation Projects and corresponding outlays/ expenditure in various plan periods is given in Table 2.4.

Table 2.3
Statewise Creation of Irrigation Potential through Major & Medium Irrigation Sector
(Th.ha.)

Sl. No.	State	Ultimate Irrigation Potential	Achievement of Potential created upto IX Plan (1997-2002)	Target of Potential creation During X Plan	Achievement of potential created during Xth Plan (upto March, 2004)
1	Andhra Pradesh	5000.00	3303.22	739.88	275.73
2	Arunachal Pradesh	**	0.00	4.00	0.80
3	Assam	970.00	243.92	116.10	22.62
4	Bihar	5223.50	2680.00	948.42	35.00
5	Goa	62.00	21.17	26.66	5.48
6	Gujarat	3000.00*	1430.37	1904.00	124.90
7	Haryana	3000.00	2099.49	119.00	0
8	Himachal Pradesh	50.00	13.35	8.00	0.50
9	Jammu & Kashmir	250.00	179.69	25.00	2.61
10	Karnataka	2500.00*	2121.12	999.89	95.64
11	Kerala	1000.00	609.49	90.00	27.09
12	Madhya Pradesh	4853.07	1386.90	265.30	74.51
13	Maharashtra	4100.00*	3239.00	1276.43	63.55
14	Manipur	135.00*	156.00	28.15	-
15	Meghalaya	20.00	0.00	-	-
16	Mizoram	**	-	-	-
17	Nagaland	10.00	0.00	-	-
18	Orissa	3600.00	1826.56	465.07	60.57
19	Punjab	3000.00	2542.48	160.30	0
20	Rajasthan	2750.00*	2482.15	413.80	96.16
21	Sikkim	20.00	0.00	0.00	-
22	Tamil Nadu	1500.00*	1549.31	9.38	-
23	Tripura	100.00	4.90	-	-
24	Uttar Pradesh	12154.00	7910.09	1000.76	134.44
25	West Bengal	2300.00*	1683.29	700.00	14.22
26	Uttranchal	346.00	280.30	6.20	0
27	Chattisgarh	1146.93*	922.50	305.00	26.15
28	Jharkhand	1276.50	354.47	315.00	4.82
29	Total U.Ts.	98.00	6.51	-	-
	Total States+U.Ts.	**58465.00***	**37046.28**	**9926.34**	**1064.79**

* - need revision ** - included under UT

Table 2.4
Planwise Outlays and Cumulative Growth in Creation of Irrigation Potential
(Major & Medium Projects)

Period	Outlay/ Expenditure (Rs. Crores)	Cumulative Expenditure (Rs. Crore)	Potential created (m.ha.)		Potential Utilized (m.ha)
			During	Cumulative	
Pre-plan period	-		9.70	9.70	9.70
I Plan (1951-56	376	376.24	2.50	12.20	12.98
II Plan (1956-61)	380	756.24	2.13	14.33	13.05
III Plan (1961-66)	576	1332.24	2.24	16.57	15.77
Annual Plan (1966-69)	430	1762.05	1.53	18.10	16.75
IV Plan (1969-74)	1242	3005.3	2.60	20.70	18.69
V Plan (1974-78)	2516	5521.5	4.02	24.72	21.16
Annual Plans (1978-80)	2079	7600.10	1.89	26.61	22.62
VI Plan (1980-85)	7369	14968.9	1.09	27.70	23.57
VII Plan (1985-90)	11107	26576.2	2.22	29.92	25.47
Annual Plans (1990-92)	5459	31534.19	0.82	30.74	26.32
VIII Plan (1992-97)	21,072	52606.29	2.22	32.96	28.44
IX Plan (1997-2002)	48259	101896.29	4.09	37.05	31.03
X Plan (2002-2007)	70862*		9.93*	46.98*	

***Provisional** **Source:** X Five-Year Plan 2002-07 of Planning Commission

Number of Major, Medium and ERM projects taken up and completed in plan and pre-plan period are shown in Fig 2.2, 2.3 and 2.4 respectively.

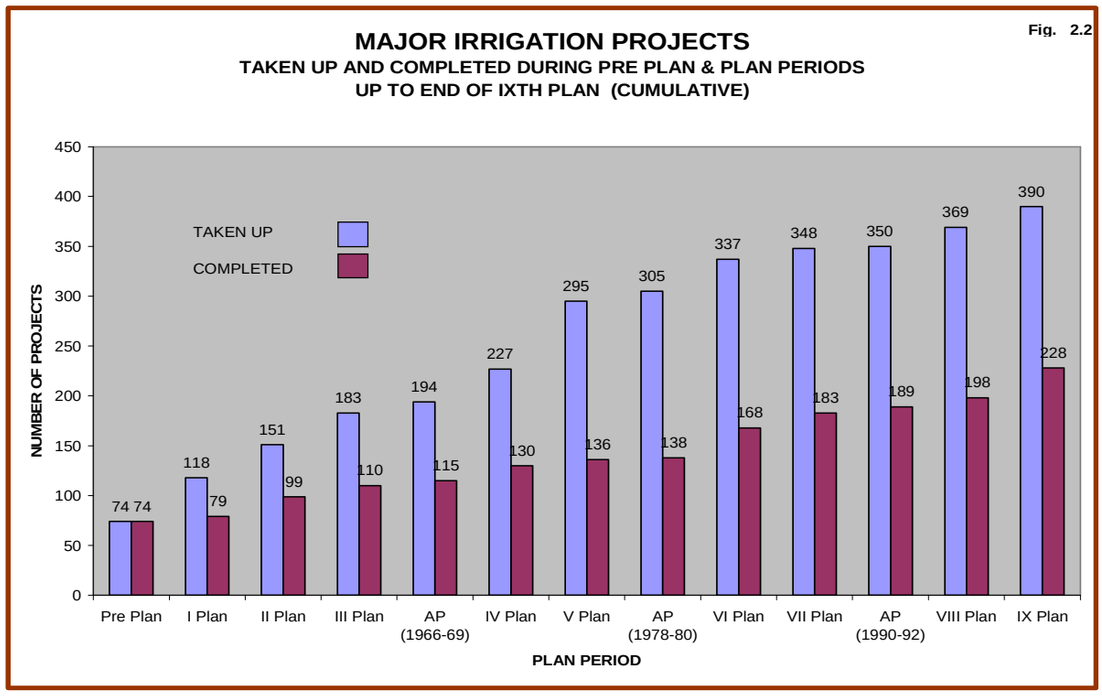


Fig. 2.3

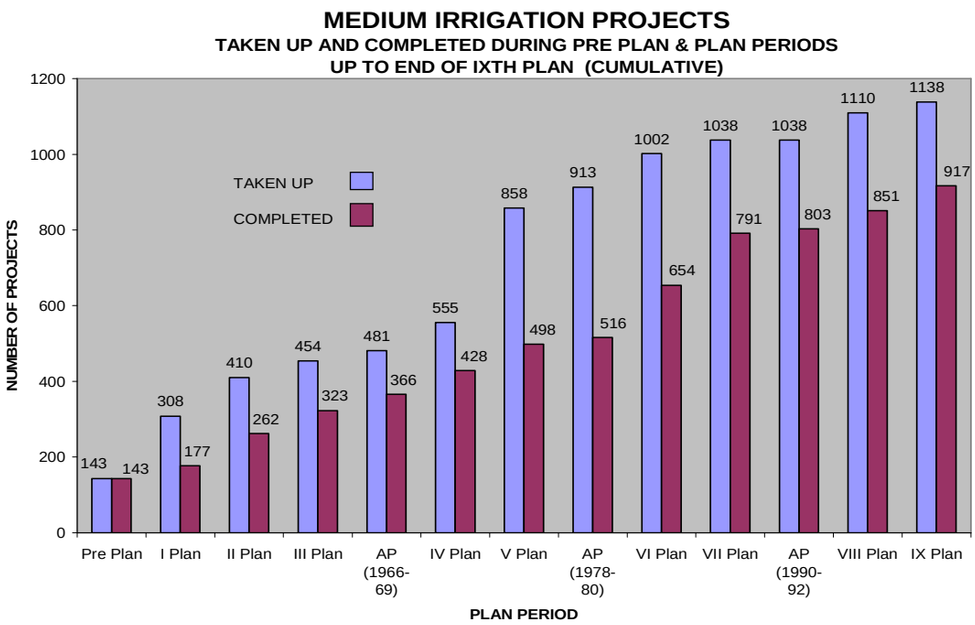
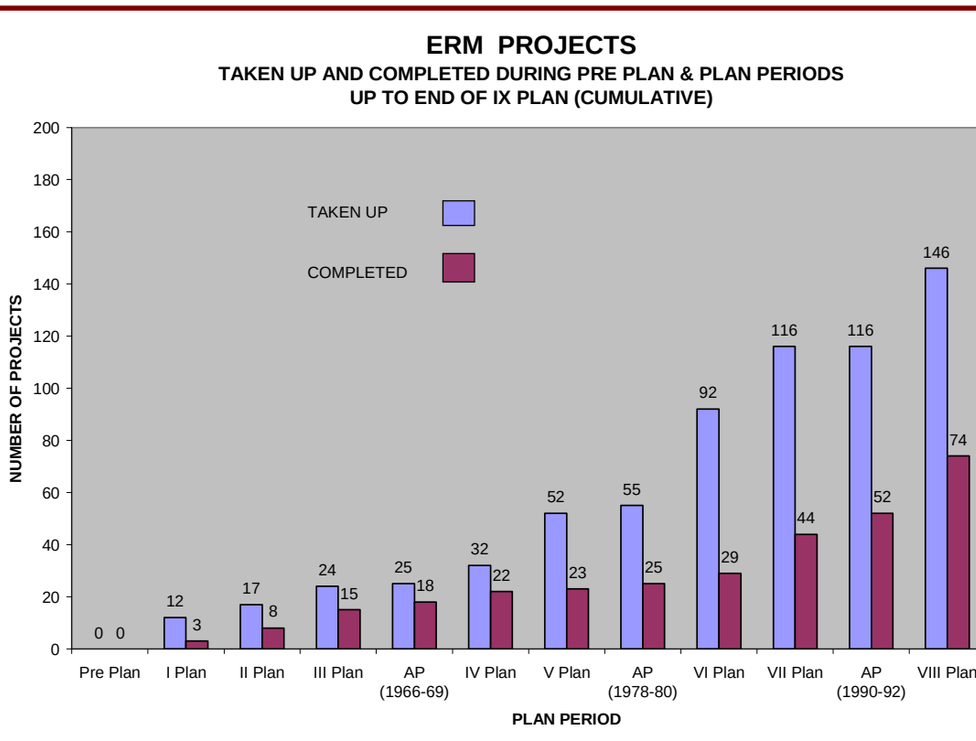


Fig. 2.4



2.2.3 Irrigation Development under Tribal Sub-Plan districts

155 Irrigation Projects benefiting Tribal Sub-Plan (TSP) districts, which were taken up prior to the formulation of the TSP, have been completed. The ultimate irrigation potential of these projects is 2252.96 Th.Ha. A total of 404 projects under the Tribal Sub-Plan districts have been completed up to end of IX Plan. The total ultimate potential from these projects is 6201.13 Th.Ha.

There are 278 on-going irrigation projects under Tribal Sub-Plan districts which have spilled over to the X Plan and the new projects taken up during X Plan. The ultimate irrigation potential of these projects is 12150.62 Th.Ha.

Fig.2.5 shows the Tribal Sub – Plan Areas and Predominantly Tribal Areas. During the year, the Status Report for the year 2003 - 04 with regard to financial progress and physical benefits of the major and medium irrigation projects was prepared.

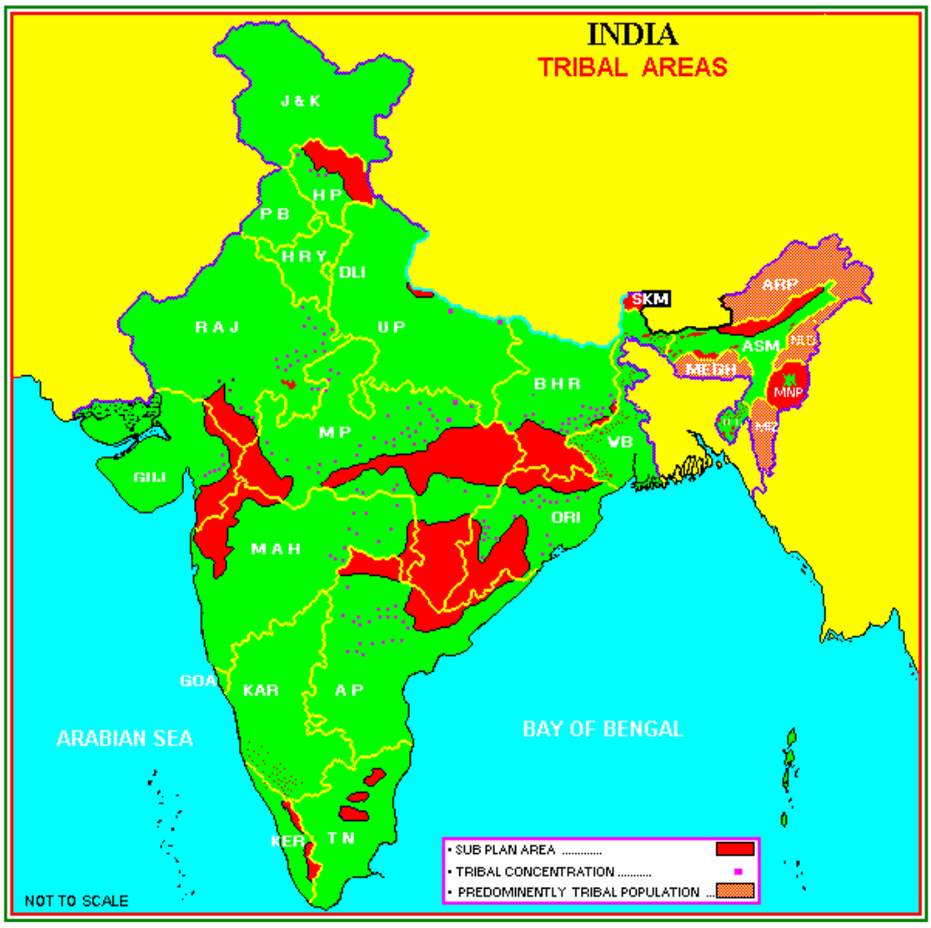


Fig. 2.5: Map of India - showing TSP Areas, Predominantly Tribal Areas and Pockets of Tribal concentration.

CHAPTER-III

RIVER MANAGEMENT

3.1 Systematic Collection and Storage of Hydrological Data

Central Water Commission at present operates Nation wide Network of 945 Hydrological Observation Stations. Out of these 945 stations, 246 are Gauge Sites, 282 are Gauge and Discharge Sites, 115 are Gauge Discharge and Water Quality Sites, 41 are Gauge, Discharge and Silt Sites, while the remaining 261 are Gauge, Discharge, Silt and Water Quality Sites. The basin-wise distribution of these sites is detailed below in Table 3.1.

Table 3.1
Basin-wise Details of Hydrological Observation Sites

Sl. No.	Name of Basin	No. of Sites
1	Indus	26
2	Ganga, Brahmaputra, Meghna/Barak	489
3.	Godavari	83
4.	Krishna	73
5.	Cauvery	34
6.	Subarnrekha	8
7.	Brahmani – Baitarni	13
8.	Mahanadi	34
9.	Pennar	8
10.	Mahi	13
11.	Sabarmati	12
12.	Narmada	31
13.	Tapi	6
14.	West Flowing rivers from Tapi to Tadri	45
15.	West Flowing rivers from Tadri to Kanyakumari	21
16.	East Flowing rivers between Mahanadi and Pennar	26
17.	East Flowing rivers between Pennar and Kanyakumari	10
18.	West Flowing rivers of Kuchh and Saurashtra including Luni	13
	Total:	**945**

The basic data collected by field units is processed and validated at the Sub-Division, Division and Circle Level and the authenticated data in the form of Water Year Books and Water Quality Year Books is published and then transmitted to CWC (HQ) for storage, updating, retrieval etc. The dissemination of data to bonafide users is processed as per the data request received in regional offices of CWC as well as at the Headquarter by the Planning & Development (P&D) Unit and Information System Organisation (ISO) of CWC.

P&D Unit is maintaining Hydrological Data pertaining to Ganga, Brahmaputra and Barak Basins in computerized format. The data of these basins being of classified nature, is provided to the bonafide users on request following a set procedure and guidelines for release of classified data. Wherever required, the approval of MoWR is sought for release of such data. Computerised data is now available for other regions also after the implementation of the Hydrology Project.

The users of the data have been categorized as below:-

(i) Central/State Government offices,

(ii) Public Sector Undertaking and Institutions/Societies working under the direct control of Central/State Governments and IITs,
(iii) Research Institutions/Scholars.

3.1.2 Hydrology Project

During 1995-96, the Government of India and nine States entered into a development credit agreement with the World Bank to implement "Hydrology Project" under a joint financing arrangement, whereby the Government of Netherlands provided related technical assistance in the form of a grant. The Hydrology Project Phase-I has been under implementation since 22 September, 1995. The total cost of the Project was Rs. 6020 million and CWC component was Rs. 734 million till the project completion date of December 2003.

Under the Hydrology Project-I, a comprehensive hydrological information system comprising the physical infrastructure and human resource to collect, process, store and disseminate data on hydrological, geo-hydrological and hydro-meteorological quantity and quality variables have been established in the Central Water Commission covering the entire peninsular region of India. Data storage centres for surface and ground water agencies have been created at Regional as well as National level for storage and dissemination of data.

A software for data storage and dissemination for all the ground water and surface water agencies has been developed under Hydrology Project and a combined catalogue containing Meta Data (information about availability of data) of various data storage centres has been hosted on the web (http//www.India-water.com). The catalogue provides on-line information to the data user about the kind of data, period of its availability and owner agency through which data user can make a map/list based selection of the data required by him and can generate Data Request File (DRF) for the same. DRF is automatically e-mailed to all the concerned data storage centres for supplying the data.

As a part of HP-I, Central Training Unit of CWC, Pune was upgraded to full fledged National Water Academy, Pune. Main institutional building (5154 sq. m), 32 room hostel with mess, guest house and other associated facilities were created and training aids, library books, computer hardware & software and other equipments were procurred.

A proposal for taking up Hydrology Project Phase-II consisting of two major components- Institutional Strengthening and Vertical Extension is under finalisation. The project envisages the consolidation of HP-I, increasing awareness for data dissemination and knowledge sharing, logistics support etc., under the Institutional Strengthening. Under the vertical extension component "Development of Hydrological Design Aids including standardization of methodology/ protocols" is a major activity. The estimated cost of the proposal is Rs.2489.76 lakh without contingencies and Rs.2962.98 lakh with contingencies.

3.2. Flood Forecasting & Warning Services

There is about 40 Mha of flood prone area in India as assessed by Rashtriya Barh Ayog, 1980 and 45.6 Mha as reported by the states to X Plan Working Group of Flood Management. For techno-economic reasons, flood management measures, wherever planned and executed in our country, have been only against the flood of certain magnitude while the floods of higher magnitude do occur creating havoc. Accordingly, flood forecasting and warning system has been planned parallel to structural measures of flood management, as advance knowledge of incoming floods play an important role in reducing flood damage as also better planning of rescue/relief operations. Flood forecasts help in optimum regulations of (multipurpose) reservoirs with or without flood cushions in them.

Flood Forecasting activities in India, in a scientific manner, made a beginning in 1958 when the erstwhile Central Water and Power Commission (CW&PC) set up a Flood forecasting Unit (FFU) for issuing flood forecasts and warnings of floods in the Yamuna at the National Capital, Delhi. This service has since been expanded by CWC to cover almost all major flood prone inter-State river basins of India. At present there are 145 level forecasting stations on major rivers and 27 inflow forecasting stations on major dams/barrages. It covers 9 major river systems in the country, including 65 river sub-basins pertaining to 15 states viz. Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tripura, Uttaranchal, Uttar Pradesh & West Bengal and one union territory Dadra & Nagar Haveli and the National Capital Territory of Delhi. Normally forecasts are issued 12 to 48 hours in advance, depending upon the river terrain, the location of the flood forecasting sites and base stations.

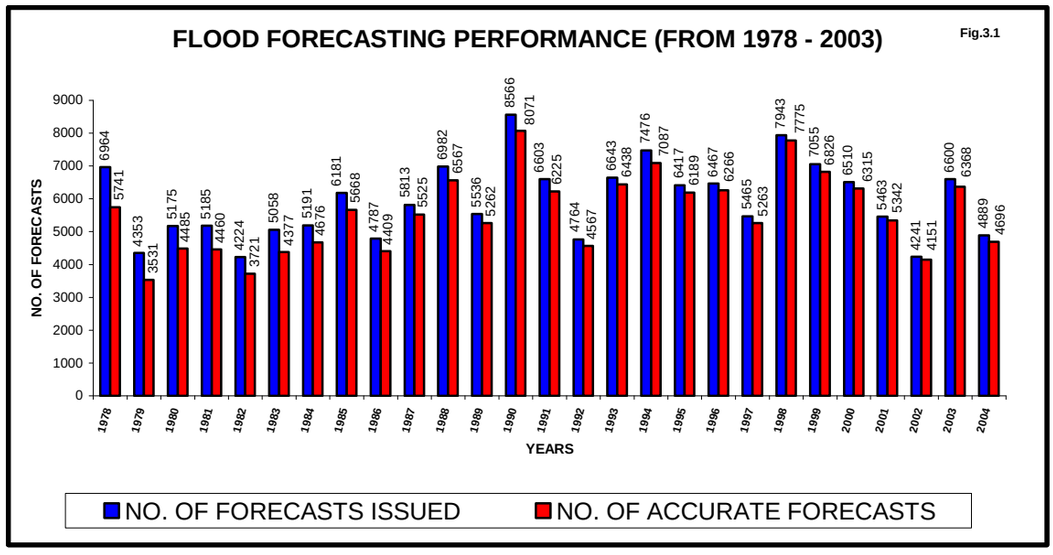
3.2.1 Flood Forecasting Performance during 2004

During the flood season of 2004 (May to October), out of 145 level forecasting sites, unprecedented flood situations, i.e., where the highest flood level attained during the flood season exceeded their respective previous high flood level (HFL), were witnessed at 10 flood forecasting sites viz. at Matizuri on the Katkhal, NT Road Crossing on the Pagladyia, Guwahati on the Brahmaputra, Dharamtul on the Kopilli, Jhanjharpur on the Kamla Balan, Basua on the Kosi, Ekmighat on the Adhwara Group, Benibad on the Bagmati, Wapi Town and Daman on the Damanganga.

In 2004, high flood situations, i.e. where peak level was within 0.5 m of previous HFL, were experienced 9 sites on the Brahmaputra and its tributaries viz Dibrugarh, Neamtighat, Tezpur, Goalpara, Dhubri, Kampur , Khowang, Numaligarh and Beki Road Bridge, 3 sites on Barak and its tributaries viz Annapurnaghat, Kalashahah, Kaimgang, 1 site Toofanganj on Raidak, 1 site Sikandarpur on Buri Gandak and 1 site Baltara on Kosi (Total 15 sites).

During the flood season 2004, all the 172 flood forecasting stations including 27 inflows forecasting site were operational. On the whole, 4889 forecasts were issued for 103 (60%) flood forecasting sites, which included 705 inflow forecasts. Out of these, 4696 (96.05%) forecasts including 654 (92.77%) inflow forecasts, were found within permissible limit of accuracy.

Graph showing the year-wise total number of forecasts issued and number of accurate forecasts is at Fig. 3.1.



3.2.2 Modernisation of Flood Forecasting Services

The Central Water Commission is making a constant endeavour in updating and modernizing the forecasting services. The forecasting of flood involves a number of stages, namely, data observation, collection, transmission, compilation and analysis, formulation of forecasts and their dissemination. To make the flood forecasts more accurate, effective and timely the modernization activities are being taken up on a continuous basis.

During the IX Plan, Modernization of inflow forecasting services in Mahanadi & Chambal basins was taken up with a view to improve the quality and accuracy of the forecasts as well as to increase the warning time to forecast through (i) Automated data collection and transmission (ii) use of Satellite based communication system through VSAT (iii) Improvement of forecast formulation techniques using computer based catchment models. This scheme is of immense help to the project authorities to know well in advance about the quantum of water likely to be received at various dam sites and flood prone cities so that they can take advance action for suitable reservoir regulation for ensuring safety of the dam as well as property and livestock. During the X Plan it is proposed to extend this system to Brahmaputra, Barak, Damodar, Krishna, Godavari, Yamuna, Ghaghra, Rapti and Sutlej river basins. Tenders have been invited and case is under process in the Ministry of Water Resources for approval of competent authority.

The use of computerized mathematical models for forecast formulation was introduced in CWC in the last two decades. Five such hydrological models viz. SSARR, HECIF, NIC, NAM-SYSTEM-11 (MIKE-11) AND CWCFFI were acquired under UNDP and Central Water Commission-DHI Schemes. Subsequently Window based MIKE-11 modelling software has been procured under World Bank aided Dam Safety Assurance and Rehabilitation Programme (DSARP). Upgrading/procurement of MIKE-11/MIKE-11FF flood forecasting models is under process under the Plan scheme “Modernisation of Flood Forecasting network including Inflow forecast” during the X Plan for more basins.

Under USAID assisted Disaster Management Project of Ministry of Home Affairs – Climate Forecasting, proposal for development of decision support system for flood forecasting and inundation forecast model for Mahanadi basin and issue of flash flood forecasting for Sutlej basin are under consideration of the Ministry. Another proposal for development of real-time flood forecasting system for Brahmaputra and Barak basin (joint project with Department of Information and Technology) is also under consideration.

3.3 Flood Situation Assessment and Flood Damages

Central Water Commission is maintaining a network of 172 Flood Forecasting stations in the country on various Inter-State river basins to monitor the flood situation during the monsoon period. As per the information received from these flood-forecasting stations, there were flood situations in the States of Assam, Bihar, Orissa, Uttar Pradesh, West Bengal and Dadra & Nagar Haveli. A statement showing damage due to floods/heavy rains throughout the country during the year 2004 is shown in Table 3.2. River Katkhal at Matizuri, river Pagladyia at NT Road Crossing, river Brahmaputra at Guwahati, river Kopilli at Dharamtul, river Kamla Balan at Jhanjharpur, river Kosi at Basua, river Adhwara Group at Ekmighat, river Bagmati at Benibad and river Damanganga at Wapi Town and Daman crossed previous HFL during the year 2004 and attained new HFL of 22.67 m, 55.45 m, 51.46 m, 58.09 m, 53.01 m, 48.84 m, 49.52 m, 50.01 m, 23.76 m and 4.00 m respectively

3.3.1 Flood Bulletins

Central Water Commission has been issuing Daily Flood Bulletins and Special Flood Bulletins during the flood season every year based on the information collected from affected State

Governments and its own field formations. During 2004 monsoon, 192 level forecast and 123 inflow forecast daily Flood bulletins were issued. In addition, 26 Special Flood Bulletins depicting high flood situation were also issued.

3.4 Flood Management Works

The Rashtriya Barh Ayog (1980) assessed 40 M ha area ($1/8^{th}$ of total geographical area i.e. 329 M ha) as flood prone out of which 32 M ha (80%) of flood prone area is protectable. Upto March 2003, an area of about 16.46 M ha has been provided with a reasonable degree of protection. The protection has been offered by means of construction of embankments (34398 km), drainage channels (51318 km.), town protection works (2400 Nos.) and by raising of villages (4721 Nos.) upto March 2003. The cumulative expenditure done under flood control upto March, 2004 is anticipated to be Rs. 8856 crores.

3.5 Flood Plain Zoning

The need for enactment of Flood Plain Zoning legislation has been emphasized in various National forums since 1957. A model bill for Flood Plain Zoning was circulated in 1975 for enactment by the State Assemblies and for implementation of its regulations. The Rashtriya Barh Ayog in their report of 1980 had also strongly recommended enactment of the Flood Plain Zoning legislation by the States on the lines of the Model Flood Plain Zoning Bill circulated to the States in 1975.

Efforts were made in the past to persuade the State Governments to expedite enactment of a suitable legislation. The X Plan Working Group on flood management also stressed upon the need of enactment of legislation for flood plain zoning. Central Water Commission has been continuously impressing upon the States for necessary follow-up action to implement flood plain zoning approach. To facilitate this effort, CWC has prepared pamphlets depicting essential features of flood plain management and circulated it to all the State Governments. Manipur and Rajasthan enacted the legislation in 1978 and 1990 respectively, whereas it is still under consideration in the States of Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Orissa, Punjab, Tripura and West Bengal. Haryana, Delhi and UP consider that existing laws are sufficient to serve the intended purpose.

Pre-requisite for implementation of flood plain zoning regulation is the availability of survey maps of suitably large scale to enable proper zoning of vulnerable areas. The Central Water Commission had initiated in 1978 a programme for such surveys under the Central sector through the Survey of India as a pilot scheme, to assist the State Governments in preparing flood risk maps. Out of the identified area of 1,06,000 sq km for flood risk mapping, survey in about 55,000 sq. km., to the scale 1:15,000 with contours at an interval of 0.3 to 0.6 m, have been completed in the States of Bihar, Assam, UP, West Bengal, Punjab, Haryana and J&K and sent to respective State Governments as well as to Ganga Flood Control Commission (GFCC) & Brahmaputra Board for preparation of flood risk zone maps.

A Working Group under National Natural Resources Management System (NNRMS) ,Standing Committee on Water Resources (SC-W) for flood risk zoning of major flood prone rivers considering remote sensing inputs was constituted by MOWR during June 1999 to examine availability of data, maps reports etc. for a test case such as the flood plains of Ganga; prepare guidelines to undertake scheme of flood risk zoning using remote sensing & other data and formulate a pilot project proposal for implementation.

The Working Group finalised broad methodology to be followed in flood risk zoning and formulated guidelines for the same. Two flood plain reaches, one on main Ganga river and another in the Brahmaputra basin were selected for taking up pilot projects for flood risk zoning through GFCC and Brahmaputra Board.

3.6 River Morphology

Morphological Studies of rivers are very important to study the behaviour of river, its aggradation/degradation, shifting of river course, erosion of river banks etc. and to plan remedial measure for erosion and other related problems. Ministry of Water Resources had sanctioned an SFC Memo "Studies of Reservoir Sedimentation and other Remote Sensing Applications" in July 2002, amounting to Rs.1383.80 lakhs for implementation during the X Five Year plan period in which Rs. 276 lakhs has been provided from Modernization of Morphological studies to be carried out by CWC. Under this component, Morphological studies of 6 flood prone rivers viz: Kosi, Gandak, Ghagra, Satluj, Ganga in a reach from Allahabad to Baxur, and Brahmaputra are to be carried out using Remote Sensing techniques. The shifting of rivers in the last 30 years is to be demarcated by remote sensing techniques. It was proposed to take up the studies in phases and some field work was started with taking up of cross-sections on Kosi and Brahmaputra. During 2004-05, survey work for cross-sections on certain stretch on river Kosi was done. The Morphology Directorate is coordinating and monitoring the work of morphological studies.

A meeting of multidisciplinary experts from different fields was held under the chairmanship of Member (RM) on 26.05.2004 to decide further course of action for compilation of the data/material already available with different agencies and pool the information at one place for preparation of a comprehensive status report. In this meeting, it was decided to entrust the work of Morphological studies of river Kosi, Ghaghra and Sutlej to NIH Roorkee and river Gandak to CWPRS, Pune. The Morphological studies of rivers Ghaghra and Sutlej were entrusted to National Institute of Hydrology, Roorkee in August 2004 and process for giving work of Gandak to CWPRS is under progress. In the meeting held on 15.12.2004, Brahmaputra Board was entrusted with the job of preparation of comprehensive report on morphological studies of river Brahmaputra for which CWC is giving logistic support.

MoWR had constituted an Inter-Departmental Committee on river Kosi to suggest the modalities for carrying out the studies in June,2004. A meeting was held by Member (RM) on 25.08.2004 wherein the modalities for carrying out the studies were finalised.

3.7 Follow-up Action on Rashtriya Barh Ayog Recommendations

The Rashtriya Barh Ayog submitted its report in 1980, which contained recommendations covering the entire gamut of flood management activities in the country. Guidelines and instructions for the implementation were circulated to Governments of States/UTs in September 1981 for expeditious action to implement these recommendations.

Status report incorporating a review of the status of implementation of various recommendations of RBA by the States/other Agencies was prepared in February, 1987 and circulated to all the states with a request to expeditiously implement the various recommendations.

The Working Group on flood management for the X Five Year Plan again emphasized the need to implement the 25 important recommendations on a priority basis in its report submitted during 2001. It has also recommended setting up an Integrated Commission for examination of the flood problem and suggesting measures to tackle the same.

Ministry of Water Resources set up an Expert Committee under the Chairmanship of Shri R. Rangachari for review of the RBA recommendations. The committee has submitted its report. The Committee has observed that in general the states have not implemented the recommendations of RBA. The Committee has identified 40 important recommendations for implementation on priority. Ministry of Water Resources has accepted the recommendations of the Committee.

MOWR has forwarded the recommendations to the states as well as central Government agencies for follow-up. CWC carried out the coordination and further follow-up activities during the year.

3.8 Task Force on Flood Management/Erosion Control

In view of the unprecedented floods this year in Assam, Bihar and some other parts of the country and as a follow-up of the announcements made by the Hon'ble Prime Minister during his visits to Bihar and Assam, the Government has set up a 21 Member Task Force headed by the Chairman, Central Water Commission vide its order dated 11.8.04 to look into the problem of recurring floods and erosion in Assam and other neighbouring States as well as Bihar, West Bengal and Eastern Uttar Pradesh. The terms of reference for the Task Force *inter alia* include study of flood/erosion problem, suggesting short term and long term measures for the management of floods and erosion control, examine international dimensions, suggest institutional arrangements for tackling the problem and source of funding for future action plan.

The Task Force / Sub-Groups visited flood prone areas in the States of Assam, Tripura, Manipur, West Bengal, Bihar and Uttar Pradesh. The Task Force submitted the report on 31st December, 2004 which is under consideration of the Government.

3.9 Water Quality Monitoring

Central Water Commission is monitoring water quality of surface water at 371 key locations covering all the major river basins of India. CWC is maintaining a three-tier laboratory system for the analysis of the parameters. The Level-I Laboratories are located at 258 field water quality monitoring stations on major rivers of India where physical parameters such as Temperature, Colour, Odour, Sp. Conductivity, Total Dissolved Solids, pH and Dissolved Oxygen of river water are observed. There are 24 Level-II Laboratories located at selected Divisional Headquarters to analyse 25 physio-chemical characteristics and bacteriological parameters of river water. Four Level-III/II+ Laboratories are functioning at Varanasi, Delhi, Hyderabad and Coimbatore where 41 parameters including Heavy Elements/Toxic parameters and Pesticides are analysed. The data generated is computerised in Data Base System and disseminated in the form of Water Quality Year Book and Water Quality Bulletins.

Level II+ Laboratory at Hyderabad has conducted 5th round of Analytical Quality Control Programme (AQC) for 25 CWC Water Quality Laboratories and 11 State Surface Water Quality Laboratories.

Ministry of Environment and Forest laid emphasis on water quality monitoring in an integrated manner by constituting the Water Quality Assessment Authority (WQAA) at national level under the provision of Environmental Protection Act through the extraordinary notification in the Gazette of India dated 22nd June, 2001 for co-ordinated effort in maintaining the quality of national water resource. Chairman, CWC is the Member of WQAA. Three meetings of WQAA have been held so far and during 2004-05, one meeting was held in December, 2004. The Chief Engineers/Superintending Engineers of CWC are the Member-Secretaries of most of State Level Water Quality Review Committees (WQRC).

WQAA has also constituted 3 standing Groups and Member (RM) is the Chairman of the Standing Group –II. The function assigned to the Standing Group-II is "to draw scheme (s) for imposition of restriction in water abstraction & discharge of treated sewage/ trade effluent on land, river and other water bodies with a view to mitigate the crisis of water quality. First meeting of the Standing Group-II was held on 5th July,2004 during 2004-2005.

WQAA has constituted a Working Group to advise on the minimum flows in the river to conserve the eco-system. Member (RM) is the chairman of the Working Group. Four meetings of

the Working Group on minimum flows have been held so far. In the last meeting held in February, 2005, draft report on the minimum flows prepared by CWC and the studies carried out by NIH Roorkee and CWC Regional Office at Hyderabad on some selected river basins were discussed. The final report and the recommendations of the working Group will be brought out soon.

3.10 Coastal Erosion

Coastal erosion is a phenomenon experienced all over the world and the Indian Coast is not an exception. A vast portion of the Indian coastline is facing constant erosion due to various reasons, natural as well as man-made. As per National Hydrographic Office, Dehra Dun, the Indian Coastline is extending to a length of about 7516.60 kms. Almost all the maritime States/UTs are facing coastal erosion problems in various magnitudes.

In order to assist maritime States/UTs to protect vulnerable coastal areas from sea erosion, two schemes, (i) National Coastal Protection Project (NCPP) for arranging external funding for coastal protection works is under formulation and (ii) Centrally Sponsored Scheme for providing central assistance to maritime States for protection of critical stretches from sea-erosion is under implementation.

3.10.1 Centrally Sponsored Scheme (CSS)

In order to provide funds to the States for completing anti-sea erosion measures in critical reaches, a Centrally Sponsored Scheme, “Critical anti-erosion works in coastal and other than Ganga Basin States”, estimated to cost Rs. 20.64 crore, is under implementation during the X Plan. So far, Ministry of Water Resources has released first installment of Rs. 50 lakh to Karnataka, Kerala and Orissa during the financial year 2003-04 and Rs. 1.00 crore to UT of Pondicherry during 2004-05.

3.10.2 National Coastal Protection Project (NCPP)

The Consolidated report for the National Coastal Protection Project (Phase-I), estimated to cost 1095.911 crore, was prepared and submitted to the Ministry of Water Resources in December 2002 incorporating proposals of the States of Karnataka, Maharashtra, West Bengal, Tamil Nadu, Orissa and UT of Pondicherry. The proposals of other States/UTs (Andhra Pradesh, Goa, Gujarat, Kerala and UTs of Andaman and Nicobar Islands and Lakshadweep) could not be included in the National Coastal Protection Project (Phase I) due to non-compliance of CWC comments. Now Ministry of Water Resources has decided to reformulate the NCPP covering all the maritime States, which is now under preparation.

3.10.3 Coastal Protection and Development Advisory Committee CPDAC)

Realising the need of over all planning and cost effective solution to the coastal problems, the Government of India constituted Beach Erosion Board in the year 1966 under the Chairmanship of Chairman, CWC (erstwhile CW&PC). With the objective of development in the protected coastal zone, the Beach Erosion Board was reconstituted and renamed as Coastal Protection and Development Advisory Committee (CPDAC) by the Ministry of Water Resources, Government of India in April 1995 under the Chairmanship of Member (RM) and representatives of all coastal States and related Central Departments.

The Beach Erosion Board held 24 meetings in all. So far, CPDAC has held 7 meetings. Last meeting of CPDAC was held at Surat (Gujarat) on 19th October 2004.

3.11 North East Water Resources Authority

In pursuance of the directions from PMO for a cohesive, self-contained entity in the North East Region (NER) for water resources development, Secretary (WR) took an inter-ministerial meeting on 24.12.04 and constituted an inter-ministerial sub-group under Member (RM), CWC to firm up the proposal. The sub-group submitted its report on the constitution of "North East Water Resources Authority" after consultation with concerned State Governments and Central Ministries and Departments. Secretary (WR) took an inter-ministerial meeting on 18.2.05, attended by the Chairman, Member (RM) and Chief Engineer (P&D) from CWC, officers from the Ministries of Environment & Forest, Law & Justice, Agriculture and Power and representatives from Planning Commission, CEA, NHPC and IWAI, to finalise the proposal at Ministry level. Draft note for the Committee of Secretaries for constitution of NEWRA was finalised and sent to MOWR on 24-03-2005.

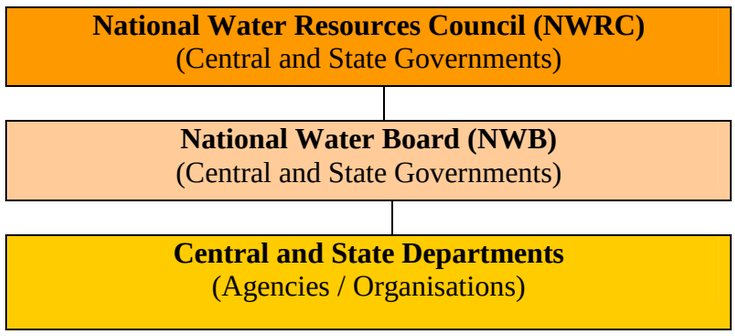
CHAPTER-IV

BASIN PLANNING

4.1 National Water Planning

The uneven distribution of water in time and space and the recurring occurrence of floods and droughts in various parts of the country have underscored the need for a national perspective in water resources development involving participation of all concerned. Planning of water resources development and utilisation is a multi-level process involving Central and State Governments, Non-Governmental Organisations and beneficiaries with intense interaction among them.

The Organisational setup as the apex body is shown below**.**



4.2 National Water Resources Council

National Water Resources Council (NWRC) was set up in March 1983 as a National apex body with the Hon'ble Prime Minister as Chairman. The composition of the Council is shown in Fig. 4.1**.** The council has held five meetings so far.

After deliberations and subsequent emergence of consensus in the 5th meeting of the National Water Resources Council held on 1st April, 2002, the National Water Policy (NWP), 2002 was adopted by the Council which directed for its circulation among all concerned.

4.3 Follow-up Action of NWP

Consensus was reached during the fifth meeting of NWRC for the followings:-

(a) Formulation of water policy for individual states.
(b) Formulation of an operational action plan with an aim to achieve the desired objectives of the policy.

Accordingly, the Action Plan for implementation of National Water Policy 2002 was adopted in 12th National Conference of Water Resources and Irrigation Ministers held on 5th February 2003 under the chairmanship of the Hon'ble Union Minister of Water Resources. The Action Plan broadly includes the proposed action points for every provision of the National Water Policy (2002) and identifies the Ministries/Departments who are to provide vital inputs towards its implementation. The proposed period for implementation of the Action points is also indicated. The Action Plan has been circulated to all State Govts./UT Administrations as well as to all CWC field offices for implementation of identified action points.

CWC followed-up with the State Govts./UT Administrations for implementation of the identified action points. Govt. of Meghalaya constituted the State level committee to prepare State water policy. Govt. of Tamil Nadu has separated out Water Resources Organisation from PWD, established two River Basin Organisations (RBOs) for Palar and Tamarabarani river basins, enacted 'The Tamil Nadu Ground Water Management Act, 2003', evolved R&R policy for the projects, constituted State Flood Control Board etc. Other States are also taking action to implement identified action points.

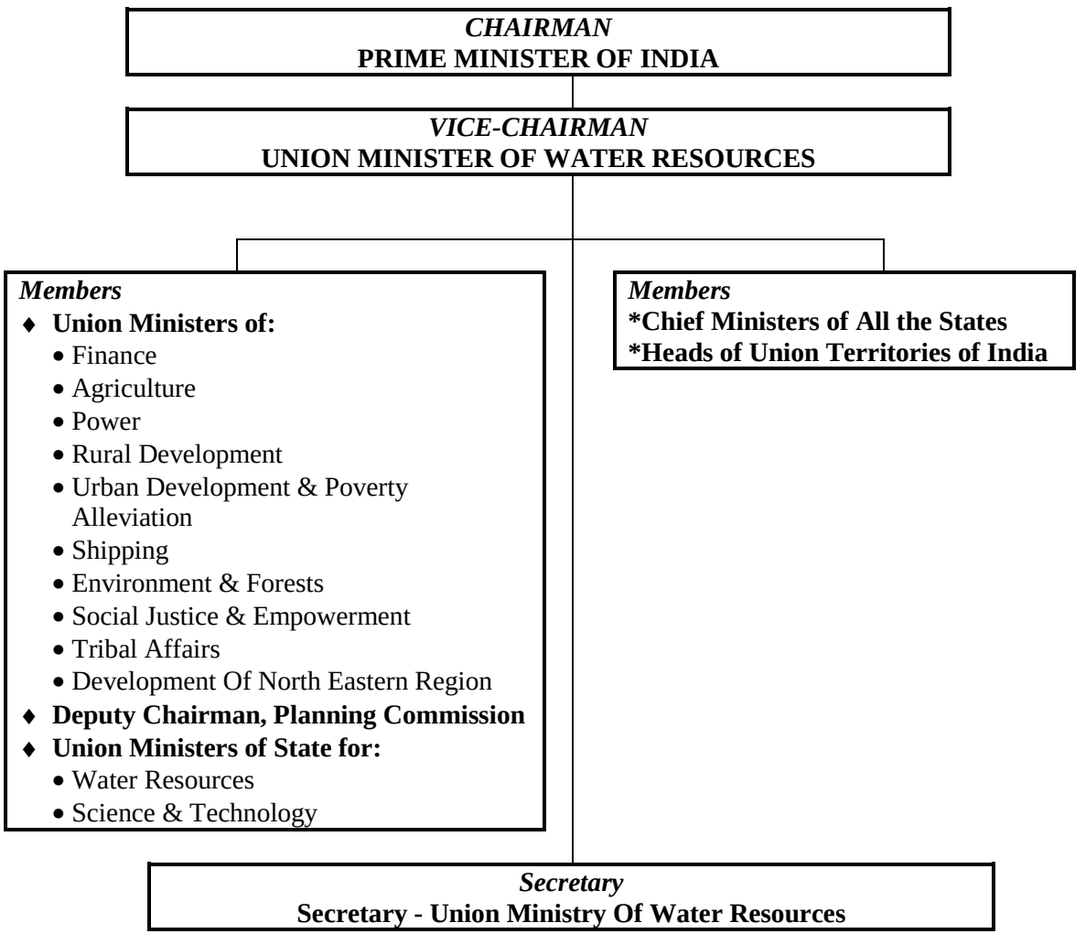


Fig. 4.1- National Water Resources Council

4.3.1 Role of Central Water Commission in Implementation of Action Plan

Details of action taken on Action Plan for implementation of National Water Policy (2002) by Central Water Commission are as follows:

- Creation of hydrological, sediment and water quality data banks under Hydrology Project in peninsular India.

- CWC has sent the base papers, which will serve as guidelines for the states, on the following action points to the State Governments to take appropriate action and incorporate provisions in the State Water Policy suitably.

  - Preparation of Integrated Water Resources Development Basins Plan
  - Division of large basin into sub-basin to act as planning unit.
  - A comprehensive Action Plan for basin, sub-basin and watershed management

- MoWR has constituted a `Core Group' under the chairmanship of Member (WP&P), CWC with the view of promoting benchmarking of irrigation projects in the States/ UTs by way of providing guidance, developing methodology, evolving work programme, coordinating activities and extending assistance in other related aspects of benchmarking. Technical and financial assistance is being provided by the MoWR and CWC to promote this activity. Four meetings of the `Core Group' have been convened so far. As per the decision taken in the third meeting of `Core Group', all states/ UT's have been requested to initiate benchmarking of irrigation systems at least with one irrigation system in their States/ UT's.

  As per provision in the Plan Scheme titled "Impact Evaluation and Benchmarking of Irrigation Systems in India", 4 National Level and 20 Project Level Workshops on Benchmarking of Irrigation Projects are to be conducted during the X Five Year Plan. First National Level Workshop on Benchmarking of Irrigation System in India under this scheme was jointly organized by North Eastern Regional Institute of Water & Land Management (NERIWALAM) and CWC during 29-30th October 2003 at Tezpur (Assam). Second workshop was conducted at Bhubaneswar during February 2004. Third Workshop was held at Chandigarh on 10-11^{th,} February, 2005.

  Draft Dam Safety Act, 2002 duly approved by MOWR has been circulated to States for enacting legislation in the respective Assemblies. Once this is done, legislation in the Parliament at the Centre can be taken up. The States are being pursued and reminded to enact the legislation at the earliest. Secretary, MOWR had taken the meetings with various Secretaries of States during Aug/ September, 2003 and requested for speedy legislation. The response in clear terms has not been received from any state.

- A Group of Experts in the Ministry of Water Resources (MOWR) under the Chairmanship of Additional Secretary, (MOWR) with Chief Engineer (BPMO), CWC as Member-Secretary was constituted to examine the various issues relating to Public Private Partnership in Water Resources Management. The terms of reference of the Committee are as follows:

  i) To frame guidelines for implementation of water resources projects by the Public-Private Partnership.
  ii) To identify the areas/ projects in which public - Private Partnership could be implemented.
  iii) To work out details of incentives for private sector participation.
  iv) Major clearances required both statutory and non-statutory, and clearing authorities.
  v) To work out procedures for clearance of projects to be taken up by the private sector.
  vi) To suggest structures of water charges and its collection.

  The Group held five meetings and has come out with a set of recommendations. The report of the Group has been submitted to MoWR.

4.4 National Water Board

To review the progress achieved in implementation of the National Water Policy and to report the progress to the National Water Resources Council from time to time, the Government of India has constituted a National Water Board in September 1990 under the Chairmanship of Secretary (WR). Secretaries of the concerned Union Ministries, Chairman (CWC) and Chief Secretaries of State / Union Territories are its Members and Member (WP&P), CWC is the Member-Secretary. The organizational structure of Board is shown in Fig.4.2.

The Board has held eleven regular and two special meetings so far. In the 11th meeting of the Board held on 14th August 2002, the main agenda items for the discussion were draft Action Plan for Implementation of National Water Policy – 2002, draft National Policy Guidelines for Sharing/Distributions of Waters of Inter State Rivers amongst States and River Basin Organisations.

Chairman, National Water Board formed a working group under the Chairmanship of the Chairman, Central Water commission with the Chief Engineer (IMO), CWC as Member Secretary and representatives from eight states namely Punjab, Rajasthan, Andhra Pradesh, Karnataka, Bihar, Chattisgarh, Madhya Pradesh, and Tamil Nadu as its members to examine draft National Policy Guidelines for Sharing/Distributions of Waters of Inter State Rivers amongst states, taking into consideration views of all states and come up with draft guidelines. The Working Group held three meetings on 31st May 2003, 18th December 2003 & 18th July 2004. The draft National Policy Guidelines have been finalized and will be considered in the next meeting of National Water Board.

During the year, agenda note for the next meeting of National Water Board was prepared and sent to MoWR.

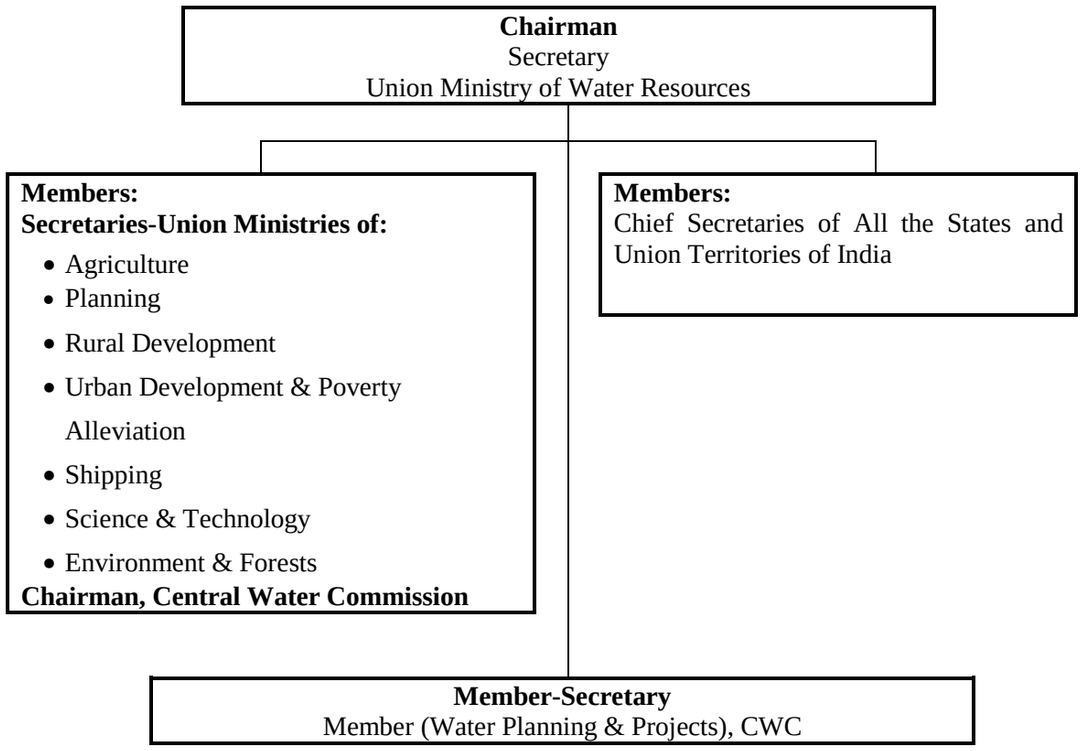


Fig. 4.2 - National Water Board

4.4.1 River Basin Organisation

National Water Board formed a Committee on River Basin Organisation, under the Chairmanship of Additional Secretary, MoWR with Commissioner (PP), MoWR as Member Secretary. The representatives from eight states namely Maharashtra, Tamilnadu, Uttar Pradesh, Jharkhand, Madhya Pradesh, Gujarat, West Bengal and Orissa were its members. The Committee was to deliberate upon the mechanism for working out in detail of the model(s) of RBOs appropriate for meeting the objectives of sustainable and optimal development of water resources of the country. The Committee held four meetings for working out model framework of establishing RBO. A national seminar on RBOs was held by NWA and IWRS at Pune in July 2003 and another one on same subject was organized by MoWR on 27-28th January 2004 at New Delhi. The report of the Committee finalized in its fourth meeting held in June 2004, has been submitted and will be considered in the next meeting of National Water Board.

4.5 Inter – Basin Transfer of Water & Interaction with NWDA

The National Water Development Agency (NWDA) is engaged in carrying out water balance studies, link canal studies for diversion of surplus waters to water deficit areas including inter-basin transfers and field surveys and investigations for preparation of feasibility reports of the link canals for water resources development with a national perspective. Chairman, CWC, Member (WP&P) and Member (D&R) are Members of Society and Governing Body of NWDA. Chairman, CWC is the Chairman of the Technical Advisory Committee (TAC) of NWDA and Member (WP&P) and Member (D&R), CWC are Members of TAC of NWDA.

A group headed by Member (D&R) finalised the Terms of Reference (ToR) for preparation of Detailed Project Reports (DPRs) of the various links identified by the NWDA for inter-basin transfer of water from surplus to deficit basin. During the year various reports prepared by the NWDA were examined in CWC with regard to methodology of the studies, inter-State angle etc.

NWDA is organising National Water Convention every two years to provide forum to deliberate, discuss and exchange experiences on important issues involved in the field of water resources development at National level. Ten National Water Conventions have been held so far and 11th Convention is proposed to be held in May, 2005. CWC provides technical support for the Convention by contributing papers, reviewing of papers for inclusion in the Convention proceedings, etc.

4.5.1 Consensus Group

In pursuance of the decision taken in the 42nd meeting of the Governing Body of NWDA, a Group has been constituted under the Chairman, CWC to discuss and expedite the process of arriving at consensus amongst the states regarding the sharing of surplus water as well as issues of preparation of detailed project report of schemes regarding interlinking of rivers. Three meetings of the Consensus Group have been held for Ken-Betwa Link and one meeting for Parbati-Kalisindh- Chambal Link. The Group has submitted its report to Secretary (WR), MOWR on 16.11.2004.

4.6 Integrated River Basin Planning, Development & Management – A Demonstration Study on Sabarmati River Basin under Hydrology Project.

A study namely, "Integrated River Basin Planning, Development & Management – A demonstration study on Sabarmati River Basin (Gujarat portion)" using RIBASIM software (developed by DELFT Hydraulics, Netherlands) has been carried out jointly by BPMO, CWC and Narmada Water Resources, Water Supply and Kalpser Deptt, Govt. of Gujarat. The study has provided exposure and experience in the use of modeling tools (Decision Support System) in studying the various developmental possibilities/ prioritization with respect to a set of objectives taking into account the physical and managerial opportunities, constraints and limitations and for assessing impact of any new infrastructure, operational and demand management measures of the basin. The study has been completed and the report of the study is under printing.

4.7 Podium Model

4.7.1 Introduction

Podium is a policy dialogue model, which has been developed by International Water Management Institute, Colombo, Sri Lanka and Central Water Commission, India. The present model predicts based on "what if Analysis" about the food grain requirement, water requirement, water balance situation and availability or deficit of surface water and ground water in the year 2025 based on 1995 data. The model can be suitably rectified if the prediction is to be made for another year with another base year data. As most of the input data are available for the year 1995

and some predictions are available for the year 2025, the model has been framed accordingly. For making the prediction for 2025 certain assumptions like population growth, per capita cereal intake, irrigated areas, rain fed areas, etc. have been made. The model's main objective is to create various scenarios of food grain requirements, water requirement and water balance situations based upon various assumptions e.g. if populations growth rate comes down to 1.8% then what will be the surface water situation in 2025, if the irrigated area is increased by about 20% then what will be the situation, if yield increases with the help of Biotechnology then what will happen. The user can also carry out sensitivity analysis by exploring various available options. In the model the unit for analysis is a sub-basin or a basin, even though analysis can be done based on administrative boundaries i.e. state-wise.

4.7.2 Main Contributions of CWC in modification of PODIUM software developed by IWMI, Colombo

1. The model `PODIUM for India" had the facility of operating it state-wise only. The model was modified to operate basinwise as well as state wise. A maximum of sixty river basins can be analysed in the model. For each river basin five scenarios can be saved at a time in the model.
2. Initially model considered only one crop season in a year, which was a major shortcoming in the Indian context. Now the model takes into account two crop seasons. Further it can also take into account the perennial crops like sugarcane etc.
3. The percolation losses due to Paddy and Recharge of Ground water have also been accounted for in the model.
4. The Return flow into the rivers from various uses has been suitably accounted for.
5. The evaporation from reservoirs, which was taken up lump sum in the model, has now been computed based on the percentage of live storage in the reservoirs.
6. At the National level cereal requirements were computed based on daily calorie intake per capita. The food grain requirements are now computed based on food grain requirements in grams/ day/ capita.
7. The model has also been improved with inclusion of the quantity of water required for non-consumptive use viz. navigation, environmental and ecological purposes etc. so as to know the total water balance in the basin/ state.
8. The basinwise water summary has been incorporated to indicate the surpluses/ deficits of water in the region.
9. The following graphs have been incorporated in the model.
    a) Pie-diagram showing sectoral water requirements in 1995 and 2025.
    b) Bar diagram showing water availability and use along with the water surplus or deficit in the basin for surface as well as ground water.
    c) Pie diagram showing percentage of water use for various purposes viz, agriculture, domestic, industrial and evaporation from reservoirs.
10. Earlier it was not possible to make changes in already created scenarios and to delete it. Now it has become possible to make any changes in already created scenarios and even it can be deleted.
11. Now the data can be entered directly in the data sheets from any other MS Excel sheets, which was not possible in the original version.

Podium model is being constantly upgraded as per requirement.

4.8 Country Policy Support Programme (CPSP)

CPSP was launched by International Committee of Irrigation and Drainage (ICID) in July 2002 and five countries namely, India, China, Pakistan, Egypt & Mexico have been identified for the studies. CPSP is meant for serving as a support programme to the water related polices in three sectors viz. Food, people and nature in an integrated manner. The aim of CPSP is being realized through compilation and updation of knowledge base, assessment of water requirements in two sample river basins, use of integrated models like PODIUM, holding of broad based

consultations at basin and at national levels, and high level policy meetings with the Governments and funding institutions for implementation of policy. In India, two sample river basins viz. Sabarmati (Gujarat) at west coast and Brahmani (Orissa) at east coast were selected for the detailed assessment and studies were carried out in CWC. The Brahmani basin is rich in water resources while the Sabarmati basin is a water deficit basin having intensive agricultural and industrial development. The studies have been completed using PODIUM model and the report is under finalization.

4.9 Domestic Water Requirement and its Availability in Urban Areas

On the request of Ministry of Urban Development, a Steering Committee under the chairmanship of Secretary (Water Resources) was constituted by the MoWR in 2001 for estimation of the domestic water requirements of the population in all the urban areas with population exceeding one million as well as identification of the water resources, which could be tapped to meet the demand of these areas. Chairman, CWC is the Co-Chairman of the Steering Committee and Chairman CGWB, Member (RM), CWC, Joint Secretary (UD), MOUD, Advisor (CPHEEO), MOUD, Director (NIH), Director (HUDCO) and Commissioner (PP), MoWR are the Members and Chief Engineer (BPMO), CWC is the Member-Secretary of the Committee. The Regional Committees under the chairmanship of Regional/Field Chief Engineers of CWC consisting of State Governments, Chief Engineer (PHED) of state governments as members and Director of the Regional Office of CWC as Member-Secretary were also constituted to assist the Steering Committee in preparation of the status report. 35 Urban Agglomerations (UA's)/ Cities having population of more than one million as per the Census 2001 were identified for preparation of the status report.

By the end of the financial year 2004-2005, 32 reports received from the Regional Committees were sent to MoWR.

4.10 Operation Manual of Tehri Reservoir

The authority for preparation of Tehri reservoir operation manual is contained in the Memorandum of Understanding (MOU) dated 15th October- 2001 signed between THDC and CWC. The work was taken up in Reservoir Operation Directorate in 2003. Based on the 69 years of simulation and detailed discussion with Tehri authorities, a draft manual for the operation of Tehri reservoir has been prepared and sent to concerned authorities for comments. Some chapters on flood management, flood forecasting network and disaster management mechanism are yet to be received from the concerned authorities.

4.11 Operation Manual of Bansagar Reservoir

Ministry of Water Resources vide its resolution no. 15/5/2001-MI/BM dated 8th March, 2002 constituted Bansagar Dam Reservoir Regulation Committee (BDRRC) headed by the Chairman, CWC with Secretary, Bansagar Control Board as its Member-Secretary. Member (WP&P), CWC is the Vice Chairman and Chief Engineer (BPMO), CWC is the permanent invitee of the Committee. Engineer-in-Chiefs, Water Resources/Irrigation department of Bihar, MP and UP are its Members. The first meeting of the committee was held on 16th July, 2003 at New Delhi wherein it was decided that Director (Reservoir Operation), CWC will prepare the reservoir operation manual considering 10-daily requirement for MP, UP and Bihar, to be supplied by the respective states and 10-daily inflow data at 75% dependability to be supplied by the Chief Engineer, Bansagar Project. Part data received from the states during the year is under process and compilation.

CHAPTER–V

DESIGN & CONSULTANCY

5.1 General

Design and Research wing plays a pivotal role on design and consultancy of water resources projects at Central Water Commission .Apart from technical appraisal of water resources development projects prepared by different agencies, various units of the wing are actively associated with Design Consultancy, Technical Studies and Research & Development activities in the water resources sector and river valley projects.

Major activities of D&R wing comprises of:

1. Appraisal of Multipurpose river valley projects in design aspects.
2. Planning and Design of hydraulic structures of water resources projects.
3. Hydrological studies.
4. Review and planning of safety aspects of dams and Monitoring.
5. Coordination of Research, development and training.

5.2 Design of Hydraulic Structures

D&R wing is actively involved in the design of almost all the major water resources projects either through consultancy or during the process of technical appraisal.

Following four design units have been established to cater to specific requirements and to attend to special design related problems of different regions.

1. Design (North & West) unit
2. Design (North - West & South) unit
3. Design (East & North East) unit
4. Design (Narmada Basin)

Each of the units have specialised Directorates such as Hydel Civil Design (HCD), Concrete & Masonry Dam Design (CMDD), Embankment Design (ED), Gates Design (GD) and Barrage and Canal Design (BCD) etc.

5.2.1 Project Appraisal

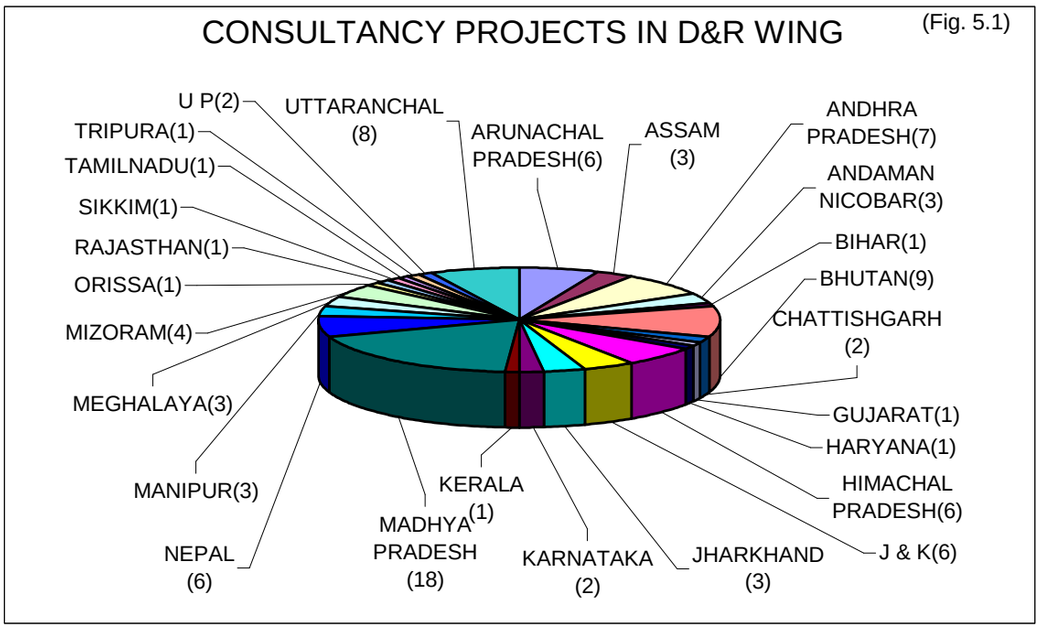
Design aspects of Detailed Project Reports of 203 projects submitted by various State Governments and other agencies were technically examined in D&R Wing during the year 2004-05. This includes one project each from Nepal & Myanmar and two projects from Afganisthan.

5.2.2 Detailed Design and Preparation of Drawings.

Design units are carrying out designs in respect of 100 projects during the year 2004-2005 as follows:

S No.	Category	No. of Projects
1.	Projects at construction stage.	68
2.	Projects at investigation and planning stage (for which detailed project reports are being prepared)	28
3.	Projects with special problems	4

State-wise break up of all the 100 projects is shown in Fig. 5.1 and list of projects in Annexure 5.1.



Some of the prestigious/important projects, which are presently being designed/handled in D&R wing, are as follows:

i) Pancheshwar Multipurpose Project & Poornagiri Re-regulating Dam (Indo – Nepal)

Under the Indo-Nepal bilateral co-operation, the scope of Pancheshwar multipurpose project is being actively discussed and defined to enable finalisation of the Detailed Project Report. The treaty between His Majesty's Government of Nepal and Government of India as signed in 1996 lays down the framework for integrated development of the Mahakali River including Pancheshwar Project, Sarda Barrage Project and Tanakpur Barrage Project. Several meetings of the Joint Group of Experts took place afterwards. DPR Chapters and Drawings have been prepared.

The proposed project envisages a 293 m high rock fill dam, just downstream of the confluence of the Mahakali and Sarju river, with central clay core and top of dam at EL. 695 m having a live storage capacity of 9.24 BCM and a dead storage capacity of 2.15 BCM In the project area, the river forms the border between India and Nepal, dividing the Far Western Development Region of Nepal from the Uttar Pradesh State in India.

The Pancheshwar project also envisages a re-regulating dam for which two alternatives at Poornagiri (1020 MW) and Rupaligad (500 MW) were considered. In the Nepalese DPR, the Re-regulating Project has been proposed at Rupaligad, which was not favoured by Indian side initially. Instead, the India side had proposed Poornagiri as the Re-regulating Project. This has been reviewed in the Ministry of Water Resources and it has been decided to consider both the alternatives. Geo-physical investigation for Rupaligad Project are to be carried out and the DPR will be prepared after receipt of the results of geo-physical investigations. However, draft DPR has already been prepared taking Re-regulating dam at Poornagiri.

ii) Tala HE Project, Bhutan.

The project envisages construction of a 91m high and 130 m long concrete gravity diversion dam across river Wangchu near Honka 3 km down stream of the existing Chukha H.E.

Project to divert 142.5 cumecs of water into 22.40 km long head race tunnel to generate 1020 MW (6 x 170 MW) power under a design head of 820 m. CWC has been appointed as design consultants for specification/construction stage works. The excavation/construction of all civil components of the project are in full swing and the necessary design and drawings for the same are being issued in time to the project authorities as per site requirements..

iii) Nathpa Jhakri HE project

Nathpa Jhakri HE project a run of the river scheme with an installed capacity of 1500 MW (6 units of 250 MW each) in Himachal Pradesh is a Joint Venture between Government of India and H.P.

The Main feature of the project comprises of 60.5 m high concrete dam on Satluj river at Nathpa. The length of dam is 185.45m. It has many unique features including the construction of a huge underground desilting complex with 4 chambers (525m. long, 16.31 m. wide and 27.5m. deep) and 25.3 km long head race tunnel of 10.15 m diameter. The project is now under operation and all six units of the projects have been commissioned.

Central Water Commission is the Principal Consultant and has been associated with this project right from its conception and has been associated with various natural and technical problems, which the project faced during and after construction.

Member (D&R) is a Member of the Board of Directors of SJVNL.

iv) Tehri Dam Project

Tehri Dam Project is the first multi-purpose river valley project, which is taken up for construction on river Bhagirathi to tap its vast potential and is being executed by Tehri Hydro Development Corporation (THDC). It envisages construction of a 260.5 m high earth and rock fill dam, which would be the fourth highest dam in the world. The design engineering and consultancy including construction drawings for dam and various spillway components like Chute Spillway, Left and Right Bank Shaft Spillways etc. are being handled in D&R wing. An inspection gallery has been provided in the core of fill dam joining left and right abutments, which is an unique feature for rock fill dam undertaken for the first time in India. The original design of this gallery as per Russian Design by HPI, Moscow was reviewed and modified construction drawings have been issued.

The other components of the project for which designs are being done are Right Bank Shaft Spillway with Intermediate Outlet, the Chute Spillway and diversion of Bahtogi Nalah, a stream discharging in right bank.

Member (D & R), CWC is a Member of the Board of Directors of THDC. CWC has been advising THDC and Ministry of Power on safety aspects of Tehri Dam.

v) Indira Sagar Project

Indira Sagar is a multipurpose project on the Narmada river near Punasa Village, district East Nimar (Khandwa) in Madhya Pradesh. The Project envisages construction of a 92m high and 653m long concrete gravity dam with a surface power house of 1000 MW installed capacity (8x125MW) and a 249 km long canal to provide irrigation in 1.23 lakh Ha of C.C.A. in the districts of Khandwa & Khargone. On completion, a reservoir of 9.75 BCM live storage capacity will be created. Design consultancy for Dam, Power house, Control structure/Head Regulator (Punasa facilities), CD structures on Indira Sagar Main Canal, Bargi Diversion Right Bank Canal and 3 x 5 MW Canal Head Power House have been provided.

vi) Sardar Sarovar Project

Sardar Sarovar project envisages construction of 1210 m long, 163 m high (above deepest foundation level) concrete gravity dam across the river Narmada, two power houses with total installed capacity of 1450 MW and 458 km long Main Canal which envisages irrigation for 17.92 lakh Ha. and drinking water to 8215 villages and 135 urban centers. Consultancy for complete planning, design and construction drawings for 6x200 MW Right Bank Power House(RBPH) and 5x50 MW Canal Head Power Houses(CHPH) under Sardar Sarovar Project, Gujarat is being provided. The spillway unit has been raised upto EL 110.6 m (MDDL) by virtue of which four units of 50 MW each of CHPH have been commissioned in Aug./Sept.,2004. CWC is also associated with monitoring of progress of construction of RBPH as per Revised Implementation Schedule (RIS 2000), through identifying bottlenecks and suggesting remedial measures and is also involved in works related to Sardar Sarovar Construction Advisory Committee, Project Review Panel, Narmada Control Authority meetings and design related issues involved with raising of dam height in various phases .

vii) Koteshwar HE Project (Uttaranchal)

Koteshwar HE project is an integrated part of Tehri Power Complex comprising of Tehri Dam & Hydro Power Plant (1000MW), Tehri Pumped Storage Plant (1000MW) and Koteshwar Hydro Electric Project (400 MW) to develop Hydro-electric potential of river Bhagirathi. The project envisages construction of gravity dam across Bhagirathi River and a surface power house with an installed capacity of 4x100 MW. The powerhouse will be located on the right bank of the river near village Pindaras of Tehri District. The reservoir created by Koteshwar dam shall also act as a lower reservoir for a pumped storage scheme as well as balancing reservoir for Koteshwar Hydel scheme. This will facilitate the functioning of Tehri Power complex as a major peaking station in Northern grid, having installed capacity of 2400 MW.

D&R wing is providing consultancy services for the entire powerhouse design including intake and tail race etc.

viii) Tehri Pump Storage Scheme (4x250 MW) Uttaranchal

Tehri Pump Storage scheme has been envisaged to generate 1000 MW of peaking power for enhancing system reliability and also to provide balancing load to the thermal base generation during off peak hours. The reservoir created by the Tehri Dam would function as upstream reservoir for this Project, while Koteshwar Dam reservoir shall be the lower reservoir. D&R wing is extending technical support right from its formulation stage as a retainer consultant.

5.2.3 Water Resources Development Projects in North Eastern Region

CWC has a dedicated design unit for East and North Eastern region to undertake design and consultancy for Multipurpose, Irrigation, Water Supply and Hydro Electric Projects. The scope of work also includes preparation of pre-feasibility and detailed project reports for schemes investigated by the field offices of CWC in North East or projects undertaken by Brahamputra Board, NEEPCO, State Govt. departments etc. Technical appraisal of PFRs and DPRs are also being carried out.

At present, there are 8 projects at construction stage for which design consultancy is being provided by D&R wing of CWC. In addition, there are 13 projects for which DPRs are under preparation.

Detailed hydrological studies and design works in respect of the projects in progress in D&R wing is the listed below:

A. Arunachal Pradesh

1. Lohit Dam Project
2. Jiadhal Multipurpose Project
3. Nuranang Chu H.E. Project
4. Tawang Chu H.E. Project
5. Nyukcharong Chu H.E. Project -Construction Stage
6. Sissiri Multipurpose Project

B. Assam

7. Harang Sub-basin Drainage Scheme - Construction Stage
8. Karbi Langpi HE Project - Construction Stage
9. Pagladia Irrigation Project

C. Manipur

10. Khuga Multipurpose Project - Construction Stage
11. Thoubal Multipurpose Project - Construction Stage
12. Irang H.E. Project

D. Meghalaya

13. Kulsi Dam Project
14. Jadukata Dam Project (Stage-I & II)
15. Myntdu HE Project - Construction Stage

E. Mizoram

16. Tuichang H.E. Project
17. Kolodyne H.E. Project Stage - II
18. Tuirini H.E. Project
19. Tuivawl H.E. Project

F. Sikkim

20. Rangit H.E. Project Stage

G. Tripura

21. Kalasi Barrage - Construction Stage

5.3 Hydrological Studies

CWC has carried out hydrological studies in respect of most of the projects in the country. At present, studies in respect of 23 projects are in hand and 146 projects were dealt by CWC during 2004-05 from hydrological point of view, wherein 15 projects were dealt for consultancy work and 131 projects were dealt for Technical Examination/Study of Hydrology.

Hydrological Studies Organisation (HSO) has come up with Indian version of regional models for rational estimation of design flood. Sub-zonal reports for estimating design flood in areas with insufficient hydrological and hydrometeorological data have been brought out by CWC, which are extensively used by various state Governments and Central Government Department/Organizations.

HSO of CWC provided assistance to the Govt. of Rajasthan in the review studies of design floods for various projects identified for rehabilitation under Rajasthan Water Sector Restructuring Project.

5.3.1 Development of flood estimation model for ungauged catchment

The economy and time constraints do not allow the water resources planner to collect hydrometeorological data at all locations. The small and medium catchments where cross drainage

structures, Roads & Railway bridges, minor hydraulic structures are planned; need estimation of design flood. HSO has come up with Indian version of regional models for rational estimation of design flood. Such models are available for 23 Sub zones out of 26 Sub zones into which the country has been divided. These models are updated time to time with the availability of additional data.

Two such models in Lower Narmada and Tapi Sub zone 3 (b) and Upper Narmada Sub zone 3 (c) were revised during the year and reports were prepared.

5.3.2 Preparation of PMP Atlas

The preparations of PMP Atlases for Ganga, Brahamputra & Barak, Indus and Krishna Basins were taken up through consultants. The PMP atlases of Krishna and Indus Basins are under preparation with the assistance of IITM, Pune. Monitoring work for this assignment rests with the Hydrological Studies Organisation of D&R wing.

5.4 Review and Planning of Safety Aspects of Dams

Dam Safety Organization is looking after following issues related to Dam Safety:-

- Instrumentation in Dams and Power House Caverns, besides other hydraulic structures.
- Special Analysis like Dam Break Modelling and foundation problems.
- Computer Aided Design.
- Monitoring and Rehabilitation of Large dams.

5.4.1. Dam Safety Assurance and Rehabilitation & Disaster Management Project [DSARDMP] – Phase II

After seeing the performance and benefits obtained from the Dam Safety Assurance and Rehabilitation Project which was assisted by the World Bank (Credit 2241-IN), it was proposed to extend the dam safety activities to the other States owning significant number of large dams. Based on the details received from the 11 participating States namely, Andhra Pradesh, Bihar, Chattisgarh, Gujarat, Jharkhand, Kerala, Maharashtra, Tamilnadu Uttar Pradesh, Uttranchal and West Bengal, a scheme “DSARDMP – Phase II” has been prepared at an estimated cost of Rs.718.99 crore and submitted to MOWR for taking up with the World Bank. The proposal has been cleared by the Planning Commission and DEA and sent to the World Bank for consideration.

In addition to above proposal, following three Plan Schemes have been approved by the Ministry of Water Resources and are in operation under Dam Safety Organization:

i) “Up gradation of facilities & skills in CWC regarding Dam Safety & Rehabilitation in India”. Approved for Rs 8.00 crores.
ii) “Setting up of specialized units in HE Designs, Pumped Storage and Instrumentation.” Approved for Rs.2.99 crores.
iii) “Up gradation & Modernization of Computerization/Information System”. Approved for Rs 12.00 crores .

The Central Water Commission would expand its existing capabilities in dam safety monitoring, including training programmes, hydrologic analysis and modernization.

5.4.2 Dam Safety Act

The draft Dam Safety Act was circulated to various State Governments and the matter is being pursued with the States to bring in the legislation at the earliest. A number of State Authorities have informed that the act is under active consideration of the respective Governments.

Government of Kerala has passed an act titled "The Kerala Irrigation and Water Conservation Act – 2003" to consolidate and amend the laws relating to construction of irrigation works, conservation and distribution of water etc. This was examined with reference to the Dam Safety issues and the State Govt. was advised to frame rules and procedures emanating from the act.

5.4.3 National Committee on Dam Safety (NCDS)

The National Committee on Dam Safety (NCDS) was constituted by the Government of India in October 1987 by broad basing the then existing Standing Committee to include all the States having significant number of large dams. The National Committee was reconstituted three times i.e. first in December 1989, again in July 1993 and in November 1997 to include States/agencies having significant number of dams. This Committee oversees dam safety activities in various States/Organisations and suggests improvements to bring these in line with the latest procedures consistent with the Indian conditions. It acts as a forum for exchange of views on techniques adopted for remedial measures to old dams in distress and provide guidance to Dam owning States/agencies. Chairman, CWC is the Chairman of this Committee.

The 26th meeting of this Committee was held on 30.11.2004 at New Delhi, under the Chairmanship of Chairman, CWC and NCDS. The meeting was attended by the representatives from 10 States besides 2 other organizations namely, NHPC & BBMB. Major dam safety issues were discussed and deliberated during the meeting. Chairman, CWC and NCDS emphasized the necessity of Dam Safety Act and requested the members to bring in legislation in their respective states. Several follow-up issues on dam safety were also discussed.

5.4.4 Technical examination of seismic and foundation aspects of river valley projects

11 river valley projects in various states namely West Bengal, Arunachal Pradesh, J&K, Uttranchal, Madhya Pradesh, Chattisgarh and Kerala were techno- economically appraised with respect to foundation engineering and seismicity aspects.

5.4.5 National Committee on Seismic Design Parameters (NCSDP)

NCSDP, earlier known as "Standing Committee to suggest Design Seismic Coefficient of Hydraulic Structures in River Valley Projects" was reconstituted in Oct.,1991. Member (D&R), CWC is the Chairman of this Committee. The meetings of this Committee are convened normally once in a year to finalise the seismic design parameters for the various river valley projects referred to the NCSDP. 15th meeting of NCSDP was held on 24.2.2005 at New Delhi and seismic design parameters for 5 projects were finalised out of six projects discussed in the meeting.

5.5 Special Studies

- Dam Break Analysis is carried out to prepare the inundation map and disaster management plan in the unlikely event of a dam failure. It estimates the maximum water level at the downstream locations of the dam in the event of a hypothetical failure of the dam. During the year, the dam break study for Phulwaria Dam was completed and draft report sent to the Govt. of Bihar.

- Due to a massive landslide on 28th June and 8th July,2004 at Ahli in Tibet (China) on river Parechu which is a sub-tributary of river Sutlej, a natural dam was formed resulting into formation of an artificial lake. A potential threat was anticipated due to possible breach of the dam causing loss of people and property situated in the downstream of the region. On a request from Ministry of Home Affairs, the dam break study for the dam formed due to the landslide on Parechu river, was made available for Disaster Management planning to the concerned authorities.

- Model Studies Report for sediment sluices/trough in respect of Baglihar H.E. Project conducted by IRI, Roorkee had been examined and comments were issued.

- CWPRS, Pune suggested in their model studies report for Tala dam spillway, that the flow conditions in the vicinity of the ski-jump jet would be violent with a potential to cause substantial erosion along both the banks. In view of this, it was proposed to have a pre-formed plunge pool with concrete lining and suitable slope protection measures. Drawings for cutting of Right Bank and Plunge Pool excavation have also been prepared.

- Spill Channel of Upper Sindh H.E. Project Stage – II (J&K) was damaged due to high flood in 2002. The case of rehabilitation of this channel was referred to CWC. Alternative alignment separating nallah discharge from spill discharge has been proposed and structural drawings were issued by CWC.

5.6 Central Water Commission Library

Library and Information Bureau, CWC is one of the most prestigious technical reference library on the subject of Water Resources Engineering and other related subjects with a huge collection of more than one lakh books and over 2.5 lakh technical journals on account of subscription to most of the reputed international and national journals.

In order to continuously improve the facilities available to the users, the following activities are being undertaken:

a) Construction of CWC Library building has been taken up through CPWD at R.K. Puram, New Delhi from July,2004. The estimated cost of the building is Rs.6,68 Crores. The new building has adequate provision for display, reading rooms and stack-rooms along with an auditorium and space for seminar/meetings etc. The super structure works have been completed and finishing works are in progress. Almost 70% construction has been completed. The construction of the Library Building is likely to be completed by January,2006.

b) CWC Library was upgraded from category II to Category III and placed under the charge of a professional librarian, namely Library and Information Officer.

c) CWC Library is in the process of being computerized by M/s C-DAC, as part of Plan Scheme “Upgradation and Modernisation of Computerisation/Information System”, which will provide intranet/internet based on-line facilities such as search of subject/title/keyboard/author, issue station, return schedule and other reference services.

Annexure – 5.1

List of Active Consultancy Projects in D&R Wing during 2004-05

ANDAMAN & NICOBAR

1. Indira Nallah Water Supply
1. Choudhary Nallah Project
2. Kamsarat Water Supply Scheme

ANDHRA PRADESH

3. Kinnerasani Dam Project
1. SRBC Owk Reservoir Complex
2. Nagarjuna Sagar Tail Pond Dam & Power Station Project
3. Annamaiah Medium Irrigation Project
4. Flood Protection Bund for IK-I & IK-A of the Singareni Colonies Company
9. Yellampally Barrage
10. Pushpara Lift Irrigation Scheme

ARUNACHAL PRADESH

11. Lohit Dam Project
12. Nyukcharong Chu H.E. Project
13. Nuranang Chu H.E. Project
14. Jiadhal Multipurpose Project
15. Sissiri Multipurpose Project
16. Tawang Chu H.E. Project

ASSAM

17. Pagaladiya Dam Project
18. Karbi Langpi H.E. Project
19. Harang Sub-basin Drainage Development Scheme

BIHAR

20. Durgavati Reservoir Scheme.

CHATTISGARH

21. Mongra Barrage
22. Mongra Irrigation Project

GUJARAT

23 Sardar Sarovar Project

HARYANA

24. Western Yamuna Canal Project Stage - II

HIMACHAL PRADESH

25. Nathpa Jhakri H.E. Project
26. Shah Nehar Irrigation Project
27. Sidhanta Medium Irrigation Project
28. SWAN River Flood Management & Integrated Land Development Project Ph-I
29. Tidong H.E. Project
30. Chamba H.E. Project

JAMMU & KASHMIR

31. Kirthai H.E. Project Stage-II
32. Parnai Hydel Project
33. Tulbal Navigation Lock Project
34. Igo-Mercellong Hydro-electric Project

JHARKHAND

35. Amanat Barrage
36. Garhi Reservoir Project
37. Gumani Barrage

KARNATAKA

38. Danimalai Tailing Dam
39. Kudermukh Iron Ore Project – Lakhya Dam

KERALA

40. Adirapally H.E. Project

MADHYA PRADESH

41. Kasna Aqueduct
42. Indira Sagar Project
43. Samoha Pick-up Weir
44. Upper Beda Project
45. Bansagar Project(Kuteshwar Lime Stone Protection Works)
46. Jobat Irrigation Project
47. Mahi Main Dam
48. Mahi Subsidiary Dam
49. Man Dam
50. Sindh Project (Phase-II) (Medikheda Dam)
51. Sagar Water Supply Scheme
52. Rani Avanti Bai Sagar Project (Bargi Dam)
53. Mohini Pick-up Weir-Sindh Phase – II
54. Mahan Dam Project
55. Kutni Feeder Reservoir Project

56. Punasa Facilities-Indira Sagar Project of NVDA
57. Malanjkhad Copper Project
58. Gulab Sagar Dam

MANIPUR
59. Khuga Multipurpose Project
60. Thoubal Multipurpose Project
61. Irang H.E. Project

MEGHALAYA
62. Myntdu H.E. Project
63. Kulsi Dam Project
64. Jadukata Dam Project

MIZORAM
65. Kolodyne H.E. Project Stage – II
66. Tuirini H.E. Project
67. Tuivawl H.E. Project
68. Tuichang H.E. Project

ORISSA
69. Naraj Barrage

RAJASTHAN
70. Mansi Wakal Project

SIKKIM
71. Rangit H.E. Project Stage – IV

TAMIL NADU
72. Pykara Ultimate Stage H.E. Project

TRIPURA
73. Kalasi Barrage

UTTAR PRADESH
74. Rihand Dam Project

UTTRANCHAL
75. Tehri Dam Project
76. Koteshwar H.E. Project
77. Koteshwar Hydro power Plant
78. Koteshwar Pumped Storage Plant
79. Nandhaur Trench Weir
80. Tapovan Vishnugad H.E. Project
81. Loharinag Pala H.E. Project

PROJECTS IN NEIGHBOURING COUNTRIES

BHUTAN
82. Tala H.E. Project
83. Punatsang Chu H.E. Project
84. Chenary Mini Hydel Scheme
85. Gyetsa(chumey) Mini Hydel Project
86. Khalanzi Mini Hydel Scheme
87. Khaling Mini Hydel Scheme
88. Lhuntshi Mini Hydel Scheme
89. Thimpu Mini Hydel Scheme
90. Wangdi Mini Hydel Scheme

NEPAL
91. Pancheshwar Multipurpose Project.
92. Sapta Kosi High Dam Multipurpose Project
93. Poornagiri Re-regulating Project
94. Rupaligarh H.E. Project
95. Sun Kosi Storage-cum-Diversion Scheme
96. Kosi High Dam

SPECIAL PROBLEM S

JAMMU & KASHMIR
97. Upper Sindh H.E. Project Stage - II
98. Baglihar H.E. Project

UTTRANCHAL
99. Kishan Ganga H.E. Project

UTTAR PRADESH
100. Rihand Dam & Power House

CHAPTER-VI

WATER MANAGEMENT, RESERVOIR SEDIMENTATION AND POST PROJECT EVALUATION

6.1 Monitoring of Reservoir Storage:

During the water year 2004 – 05, Central Water Commission monitored storages of 71 important reservoirs of the country having total live storage capacity of 131.28 BCM. During the year, FRL capacity of 5 reservoirs was revised making the total designed live capacity at FRL to 131.22 BCM.

Table 6.1
Storage status of current year vis-à-vis previous year

Description			Water Year	
			2003-04	2004-05
Number of Reservoirs			71	71
Total Designed live storage in BCM			131.28	131.228
Actual Storage	On June, 1 *(Start of water year)*	In BCM	14.299	16.727
		In % of storage at FRL	11%	13%
		In % of 10 Years Avg. Storage	64%	78%
	On Sept, 30 (*End of Monsoon Period*)	In BCM	78.75	85.12
		In % of storage at FRL	60%	65%
		In % of 10 Years Avg. Storage	81%	90%
	On March 31 *(End of Water Year)*	In BCM	26.91	29.67
		In % of storage at FRL	20%	23%
		In % of 10 Years Avg. Storage	75%	85%

54 more projects have been identified (each having storage capacity of 0.250 BCM or more) for inclusion in the monitoring system. Inclusion of these 54 reservoirs will raise the number of projects under monitoring to 125 and the storage capacity from 131.22 BCM to 156.69 BCM, i.e. about 74 % of the total capacity of 213 BCM created so far. Efforts are being made to collect requisite information from the state/project authorities so as to bring these projects under the monitoring system of CWC.

A bulletin on the status of reservoir storages is being issued every week. The weekly bulletin contains current storage position vis-à-vis storage status on the corresponding period of the previous year and average of last 10 years on the corresponding period. The information presented in the bulletin is being used by the Crop Weather Watch Group constituted by the Ministry of Agriculture for reviewing the crop planning strategy based on the availability of water in the reservoirs.

6.2 Cauvery Water Bulletin:

Weekly storage position of five important reservoirs in the Cauvery basin is also monitored and a bulletin is issued every week. This bulletin incorporates the designed live storage capacity, live storage of current year, last year and average of last 10 years of the respective week in four reservoirs of Karnataka State (Kabini, Hemavathy, Harangi, Krishnaraja Sagar) and one reservoir in the state of Tamilnadu (Mettur). Bar Charts (i) indicating Monthly / Weekly flow as per Cauvery Water Dispute Tribunal's (CWDT) award, observed flow at Billigundulu G&D site of

CWC upstream of Mettur reservoir and inflow in Mettur reservoir and (ii) Combined storage position of four reservoirs in the State of Karnataka and that of Tamilnadu are also supplemented in the bulletin. Four such bulletins were issued every month. Special bulletins were also prepared at the time of meeting of the Cauvery Monitoring Committee which is headed by the Secretary (WR).

6.3 Watershed Management and Reservoir Sedimentation

6.3.1 Hydrographic Survey of Important Reservoirs:

Capacity Survey of reservoirs is a continuing scheme hitherto known as "Hydrographic Survey of 30 Important Reservoirs in the country" initiated during VIII Plan and continued through IX Plan. At the end of IX Plan, 19 reservoirs were covered under the scheme at a total cost of Rs 4.26 crore. Survey of 16 reservoirs were completed in all respects and for three finalization of report was carried over to first year of X Plan.

An SFC covering 15 more reservoirs for capacity survey during X Plan at an estimated cost of Rs 3.29 crore was sanctioned in February 2003. Capacity Survey work in respect of three reservoirs namely Watrak (Gujarat), Warna (Maharashtra) and Ravisankar Sagar (Chattisgarh) was taken up during 2003-04. Final reports of Warna, Watrak and Ravishankar Sagar reservoirs have been received. During 2004-05, award of work for 10 more new reservoirs for capacity survey was under consideration.

6.3.2 Status Report on Watershed Management and Water Harvesting

The Status Report on Watershed Management and Water Harvesting has been finalized and is under printing.

6.4 Remote Sensing in Water Resources Development and Management

The scheme "Studies on Reservoir Sedimentation, River Morphology and other Remote Sensing Applications" has been taken up as a continuing scheme during 10th Five Year Plan at an estimated cost of Rs. 1383.80 lakh. The approved outlay for the scheme for 2004-05 was Rs. 400 lakh. The scheme comprises of four components namely:

A) Remote Sensing applications in Water Resources Development and Management
   - Reservoir Sedimentation using satellite remote sensing for 79 reservoirs.
   - Resource Information System for two basins/sub-basins.
   - Command Area Management for two project commands.
   - Assessment of water logging, salinity and alkalinity affected soil in the whole country.

B) Estimation of sedimentation in reservoirs - conducting Hydrographic surveys of important reservoirs in the country (15 reservoirs).
C) Watershed and reservoir sedimentation studies.
D) Modernisation of Morphological studies.

Remote Sensing Directorate is carrying out component A of above plan scheme. Progress of the works is as follows:

- The work "Satellite Remote Sensing Based Sedimentation Analysis of Twenty Reservoirs in India – Phase I" awarded to Regional Remote Sensing Service Centre (RRSSC), Jodhpur during Oct'2003 has been completed and final reports of 18 reservoirs were prepared and circulated to all concerned.

- During 2004-05, the work "Satellite Remote Sensing Based Sedimentation Analysis of Twenty Reservoirs in India – Phase II" was taken up. The work has been awarded to National Remote Sensing Agency (NRSA), Hyderabad and Maharashtra Engineering Research Institute (MERI), Nashik for ten reservoirs each.

- Final report "Satellite Remote Sensing Based Sedimentation Analysis of Ranapratap Sagar, Rengali & Machhkund reservoirs" (in-house study) has been completed and circulated to all concerned. Sedimentation studies (In-house) for Upper Tapi, Watrak, Almatti & Balimela reservoirs are under finalisation.

- The work of satellite monitoring of two AIBP projects namely, Upper Krishna Project Stage-I, Karnataka and Teesta Barrage Project, West Bengal awarded to NRSA, Hyderabad.

In addition to above, during 2004-05, two training programmes on "Image processing and GIS Fundamentals including application for water resource development" were conducted at NWA, Pune in October 2004 and at RRSSC, Bangalore in February 2005.

6.5 Identification of Waterlogged, Salinity/Alkalinity Affected Areas Using Remote Sensing Technique.

In order to update the data of the Working Group Report, 1991, of Ministry of Water Resources, on water logging, salinity & alkalinity, a study on "Assessment of waterlogged and Salinity and/ or Alkalinity affected areas in irrigated commands of all major and medium projects throughout India using Remote Sensing Technique" has been taken up by Central Water Commission in collaboration with "Regional Remote Sensing Service Centre" (RRSSC), Jodhpur. The preparation of statewise status report on water logging and salt affected soil will be completed within the frame work of X Five Year Plan. In first phase of the study, six reports in respect of Rajasthan, Karnataka, Goa, Bihar, Jharkhand and Haryana have been prepared. These reports have been circulated to the concerned State Governments for taking remedial measures for reclaiming waterlogged and/or saline/alkaline areas of various irrigation commands.

Out of the Rs. 296.00 lakh provision made for this work, an amount of Rs. 90.00 lakh was paid to RRSSC Jodhpur as first installment during 2003-04. Payment of second installment of Rs. 110 lakhs is under process.

6.6 System Performance Overview of Completed Irrigation Projects:

CWC is carrying out Performance Evaluation of completed irrigation projects. During 2004-05, the Report on "Performance Evaluation Study of Gandidpalam Irrigation Project, Nellore (AP), which was taken up departmentally was finalized and findings circulated to the state Government and concerned Project Authorities for follow-up action and giving feed back on the remedial measures taken. Another study on the "Performance Evaluation of Jojwa Wadhwan Irrigation Project, Vadodara (Gujarat)" has been taken up departmentally, which is under progress.

6.7 Benchmarking of Irrigation Projects

Union Ministry of Water Resources initiated Benchmarking of Irrigation Projects in the country by organizing a "National Workshop on Benchmarking of Irrigation Projects" in February 2002 at Hyderabad. On the basis of inputs from this workshop, "Guidelines on Benchmarking of Irrigation Systems in India" have also been finalized and disseminated among Water Resources / Irrigation Departments of States and Union Territories in the country. Subsequently, during the year 2002 itself, three state level workshops at Water and Land Management Institute, Patna

(Bihar), Irrigation Management and Training Institute, Trichy (Tamil Nadu) and Water and Land Management Institute, Aurangabad (Maharashtra) were convened.

Ministry of Water Resources has constituted a "Core Group on Benchmarking of Irrigation Systems in India" under the Chairmanship of Member (WP&P), CWC for assisting and encouraging States and Union Territories for implementation of Benchmarking in Irrigation Sector in the country in the form of providing guidance, developing methodology, evolving work programme, coordinating activities and extending assistance in other related aspects of benchmarking. Six meetings of the 'Core Group' have been convened so far. Out of this, two meetings were convened during 2004-05.

A plan scheme titled "Impact Evaluation and Benchmarking Studies of Water Resources Projects in India" is under operation in Central Water Commission during current five-year plan. This plan scheme has adequate provision for conducting National / Regional level and Project specific workshops on benchmarking of irrigation systems in the country. During the X five year plan, four regional / state level workshops on benchmarking of irrigation projects are targeted to be organized. Two workshops one each at NERIWALM, Tezpur (Assam) and Bhubaneswar (Orissa) have already been held in the year 2003-04 and the third workshop was organized at Chandigarh during 10-11 February 2005. Fourth such worshop is proposed to be organized at Gandhinagar (Gujarat) in May, 2005.

6.8 Socio/Agro Economic & Environmental Impact Studies of Completed Irrigation Projects

Performance evaluation studies of irrigation projects in the country were taken up in seventies. Since then, Performance evaluation studies in respect of more than 100 irrigation projects located in different parts of the country have been carried out by various central, state and other agencies viz Ministry of Water Resources, Central Water Commission, Central Board of Irrigation and Power and Irrigation Departments of States.

Performance evaluation studies of completed irrigation projects are now being carried out by Central Water Commission departmentally as well as through consultants (mostly through WALMIs, IMTIs, WAPCOS, CWRDM and NERIWALM) and reports of the studies are provided to Water Resources/ Irrigation Departments of concerned States and other related Organisations for implementation of recommendations. 14 such studies were got done through consultants, which cover (a) System Performance (b) Agro-economic (c) Socio-economic and (d) Environmental Impacts. In addition, 6 studies have been carried out departmentally which mainly deal with system performance of the irrigation projects.

Performance evaluation studies in respect of ten irrigation projects located in various regions in the country are targeted to be accomplished, through consultants, during the X five-year plan. The studies in respect of four projects, viz. Kanchi Weir (Jharkhand), Samrat Ashok Sagar Irrigation Project (M.P.), Salki Irrigation Project (Orissa) and Sukla Irrigation Project (Assam) were awarded to the consultants during the financial year 2003-04. Inception reports of these four studies have been received during December 2004. Proposal for award of work for six projects, viz. Itiadoh Irrigation Project (Maharashtra), Kodaiyar Irrigation Project (Tamil Nadu), Chambal Irrigation System (M.P. & Rajasthan), Loktak Irrigation Project (Manipur), Nanak Sagar Irrigation Scheme (U.P.) and Chandan Reservoir Project (Bihar) have been finalized during 2004-05 and submitted to MOWR for sanction.

CHAPTER-VII

APPRAISAL OF PROJECTS

7.1 Project Appraisal

One of the important activities assigned to Central Water Commission is techno-economic appraisal of irrigation, flood control and multipurpose projects proposed by the State Governments. This task is performed and coordinated by the Project Appraisal Organisation (PAO). After establishment of techno-economic feasibility of the project, the Advisory Committee of Ministry of Water Resources (MOWR) on Irrigation, Flood Control and Multipurpose Projects headed by the Secretary, Water Resources (WR) considers projects for acceptance and thereafter recommends the same for investment clearance to the Planning Commission. Besides these, the Hydro-power projects proposed by State Electricity Boards / Private Sector Organisations are also scrutinised in CWC from the view point of hydrology, civil design, inter-state issues and cost angles and for establishing water availability for cooling and other purposes in case of thermal projects and Techno Economic clearance is accorded by Central Electricity Authority (CEA). Technical aspects of water supply schemes are also appraised when referred by the State Governments.

. A similar function is discharged by the Project Preparation Organisation (PPO) under a Chief Engineer in respect of Major, Medium Irrigation and Water Resources Consolidation Projects, which are posed for external assistance.

7.2 Appraisal of Major Irrigation Projects

Major Irrigation Projects with Culturable Command Area (CCA) of more than 10,000 hectares are examined for various aspects in specialised Directorates in CWC and in the Ministries of Water Resources, Agriculture, Environment & Forests and Tribal Affairs. In case of multipurpose projects, examination in Central Electricity Authority is also done for power component. The existing procedure for scrutiny and examination of irrigation and multipurpose projects by Central Water Commission and acceptance by the Planning Commission for inclusion in the State Development Plan has been revised and simplified. Now Preliminary Report, prepared in brief, covering basic planning aspects are examined first and 'In Principle' consent of CWC for DPR preparation is communicated on the basis of soundness of proposals. Clearances for Environment, R&R plans and concurrence of State Finance etc. are to be obtained and submitted along with DPR so that once cleared by the Advisory Committee, the investment clearance of the Planning Commission would follow soon and the project can be started without waiting for different clearances from different sources. The revised two stage clearance procedure is applicable w.e.f. October 2001.

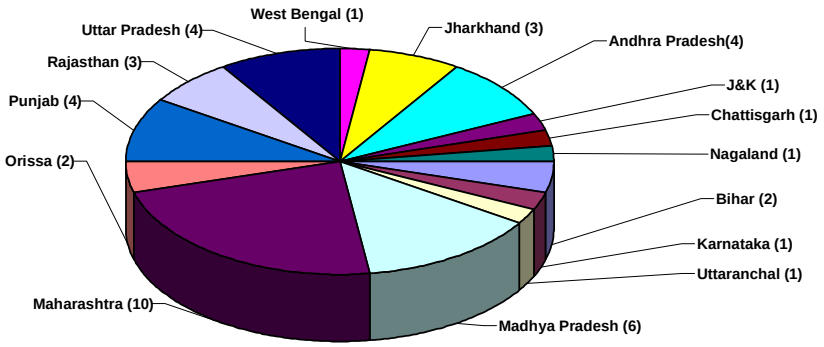
During the year 2004-05, 44 New Major and 16 Revised Major Irrigation Projects were under appraisal in the Project Appraisal Organisation. In principle consent of CWC for DPR preparation was communicated in respect of 6 Major Irrigation Project proposals. A Pie Chart showing state-wise distribution of new major irrigation projects is shown at Fig. 7.1.

7.3 Appraisal of Medium Irrigation Projects (in Inter-State River Basins)

For Medium Irrigation Projects (CCA 2,000 to 10,000 hectare), State Governments are required to submit only a Performa report to the Appraisal and Monitoring Units of the CWC's field formations. During the year 2004-05, 57 new Medium Irrigation Projects were under appraisal in various Regional Offices for which necessary assistance was provided by PAO, CWC. After appraisal, projects are put up by the PAO to the Advisory Committee for consideration and acceptance. Pie Chart showing the State wise distribution of new Medium Irrigation Projects is shown in Fig. 7.2

Fig. 7.1

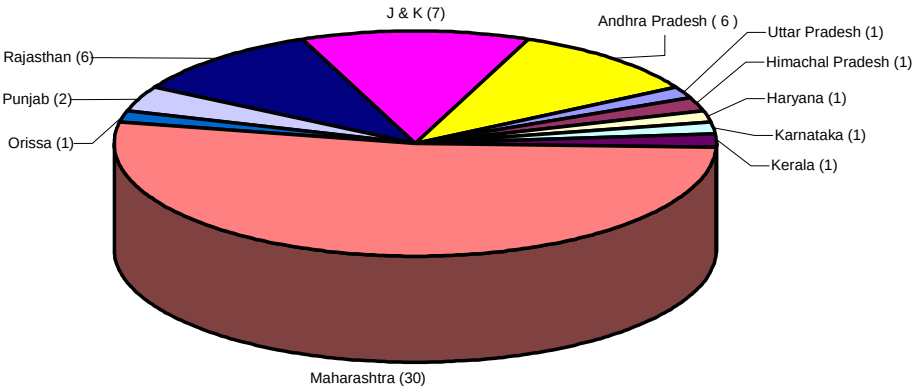
State Wise Distribution of new Major Irrigation Projects under Appraisal
(As on 31.03.2005)



Total Projects - 44

Fig. 7.2

State Wise Distribution of new Medium Projects Under Appraisal
(As On 31.03.2005)



Total Projects - 57

7.4 Interaction with State/Project Authorities

To expedite the appraisal process, Central Water Commission officers interact regularly with the State Govt. Engineers and inter-state review meetings are convened to resolve issues having a bearing on project clearance. The State Governments have also been advised to process the projects through State Central Design Organisation and to set up State Level Multidisciplinary Committees so that the extent of scrutiny at the Centre can be minimized.

7.5 Meeting of the Advisory Committee

In November 1987, the Ministry of Water Resources reconstituted the Advisory Committee for Irrigation, Multipurpose and Flood Control Projects with the Secretary (WR) as the Chairman and the Chief Engineer (PAO), CWC as the Member Secretary. The agenda notes are prepared in CWC, approved by Member (WP&P) and put up to the Committee for consideration. The Committee is entrusted with the function of examining proposals scrutinised in the CWC and conveying the decision on the techno-economic viability of the projects. During the year 2004-05, the Advisory Committee met on 18.06.2004 under the Chairmanship of the Secretary (WR). The committee considered and accepted one Flood Control Project viz. Protection work on the Left Bank of river Ganga U/S of Farakka Barrage from spur No.17 in village Panchananandpur, P.S.Kaliachak, district Malda of West Bengal. The project will provide protection to an area of 213.07 hectare, which in turn will save an average of Rs. 5.144 crore annually.

7.6 Appraisal of Power Projects

Thirty Hydroelectric and Twelve Thermal Power Projects were also under appraisal. During the year, 4 Hydro Projects having total installed capacity of 1224 MW and 7 Thermal Power Projects having total installed capacity of 6100 MW examined by CWC were finally cleared by CEA.

7.7 Expediting Environmental and R&R Plan Clearance

Chairman CWC convened region-wise review meetings to discuss pending issues of environmental & forest and R&R, for the projects cleared by the Advisory Committee of MoWR, which were awaiting Investment clearance by Planning Commission, with the concerned State Irrigation Secretaries by involving State Forest Secretaries and Principal Chief Conservator of Forests (PCCFs) of State Governments and Regional Chief Conservator of Forests (CCFs) of Ministry of Environment and Forests (MoEF). During the year 2004-05, five region-wise review meetings were held to discuss 80 projects and the progress made on the decisions taken in the meetings held in 2004 were reviewed.

7.8 Appraisal and Clearance of Flood Management Projects

Flood Management Organisation of the Central Water Commission examines the proposals pertaining to basins other than the Ganga basin, received from the respective State Govts., concerning Major, Medium and Minor Flood Management Projects and Multi purpose Projects having flood control aspects to establish their techno-economic feasibility before submission to the Technical Advisory Committee on Irrigation, Flood Control and Multi-Purpose Projects of the Ministry of Water Resources for approval and investment clearance by the Planning Commission. Such proposals pertaining to Ganga basin are examined in Ganga Flood Control Commission (GFCC).

As per the revised guidelines issued by the Planning Commission in Sep, 2003, schemes costing upto Rs. 7.5 crore can be sanctioned by the State Govt. after they are duly approved by the State Flood Control Board (FCB) on the advice of State Technical Advisory Committee. Schemes having inter-state implications should be cleared by CWC (for schemes in basins other than Ganga basin)/ GFCC (for schemes in Ganga basin) and schemes with international implications should be got cleared from MoWR before approval by the State Flood Control Board. Schemes costing more than 7.5 crore and not exceeding 15 crore, which are on inter-state rivers and tributaries after processing through State TAC & FCB, will be examined in CWC/GFCC, as the case may be, for Techno-economic clearance. On the recommendations of CWC/GFCC, the approval of these schemes for inclusion in Plan will be processed by the Planning Commission. For schemes with international implications, State Govts. are required to obtain specific clearance from MoWR before recommending to CWC/GFCC for detailed examination and Techno-economic clearance.

For all schemes costing more than 15 crore, the same procedure as applicable to schemes costing between 7.5 crore to 15 crore has to be followed. The schemes will be put up to the TAC of MOWR for approval and subsequent investment approval of the Planning Commission.

In the year 2004-05, 65 flood management schemes/master plans have been examined/ appraised and cleared.

CHAPTER – VIII

MONITORING OF PROJECTS

8.1 Monitoring of Major and Medium Projects

A three-tier system of monitoring at Centre, State and Project level was introduced in 1975. The main objective of monitoring is to ensure the achievement of physical and financial targets for timely completion of projects, identification of the inputs required, analysis of the reasons for any shortfalls/bottlenecks and suggest remedial measures etc., with a view to complete them in a time bound manner and to achieve the targets of creation of irrigation potential. At Central level, this work was entrusted to CWC.

Initially, few projects were identified for monitoring. Subsequently this list was reviewed and gradually the number of Monitored Projects increased. With the regionalisation of CWC in the year 1995, it became possible to bring a large number of the ongoing Major and Medium projects under the ambit of monitoring. As per the present arrangement, Inter-State, Externally Assisted and Centrally Sponsored projects are being monitored by Monitoring units at Headquarter and the other projects by various field units. The list of monitored Projects is reviewed on yearly basis and during 2004-05, 135 projects were under monitoring in CWC.

Out of 135 Major, Medium and ERM projects taken up for monitoring by CWC during 2004-2005 (Table – 8.1), 14 projects (8 Major & 6 ERM) were monitored from HQs by the Project Monitoring Organisation (PMO) comprising five Monitoring Directorates under a Chief Engineer. The remaining 121 projects (80 Major, 38 Medium and 3 ERM projects) were monitored by the Field Monitoring / Monitoring & Appraisal Directorates of CWC.

Besides above, during the year 2003-04, 30 Major pre-fifth / fifth Plan Ongoing Projects were identified for completion by the end of X Plan and were put on vigorous monitoring by CWC field units requiring more than one visit in a year. The task of vigorous monitoring was assigned to the specific field officers of CWC to ensure their completion as stipulated. Out of these 30 projects, 4 projects were completed by the end of 2003-04. The remaining 26 projects are included in the list of 135 projects, which were taken up for monitoring during 2004-05. The projects which were under vigorous monitoring during 2004-05 are also shown in Table – 8.1. 3 projects were completed during 2004-05 making a total of 7 projects upto March, 2005 (Table 8.2).

All the projects identified for monitoring are visited by CWC officers once a year. Thereafter, based on field visit and discussions with the State Govt. Officials, a detailed status report is prepared highlighting various constraints impeding construction & suggestions for remedial measures etc. for attention of the State Govt. to expedite progress for early completion of the projects. The overall co-ordination regarding monitoring of projects is done by the PMO. State-wise distribution of ongoing Major, Medium and ERM projects monitored by CWC Head Quarter or Field units are given in Figures 8.1, 8.2, & 8.3.

TABLE 8.1 – State-wise Abstract of Number of Projects Monitored by CWC (2004-05)

Sl. No.	State	Monitoring by CWC (FU & HQ)			Monitored by HQs		
		General Monitoring			General Monitoring		
		Major	Medium	ERM	Major	Medium	ERM
1.	Andhra Pradesh	7	5	1	1	-	1
2	Assam	3	1	-	-	-	-
3	Bihar	5	1	1	-	-	-
4	Chattisgarh	3	1	-	-	-	-
5	Goa	2	-	-	-	-	-
6	Gujart	-	4	1	-	-	1
7	Haryana	3	-	-	-	-	-
8	Himachal Pradesh	1	-	-	1	-	-
9	Jammu & Kashmir	-	-	-	-	-	-
10	Jharkhand	3	3	-	1	-	-
11	Karnataka	6	6	1	-	-	-
12	Kerala	3	1	-	-	-	-
13	Madhya Pradesh	10	-	-	1	-	-
14	Maharashtra	21	4	-	1	-	-
15	Manipur	2	-	-	-	-	-
16	Meghalaya	-	1	-	-	-	-
17	Orissa	7	1	1	1	-	1
18	Punjab	1	-	1	-	-	-
19	Rajasthan	4	4	1	1	-	1
20	Tamil Nadu	-	1	1	-	-	1
21	Tripura	-	1	-	-	-	-
22	Uttar Pradesh	5	-	1	1	-	1
23	West Bengal	2	4	-	-	-	-
	Total	**88**	**38**	**9**	**8**	**0**	**6**
	Grand Total	**135**			**14**		

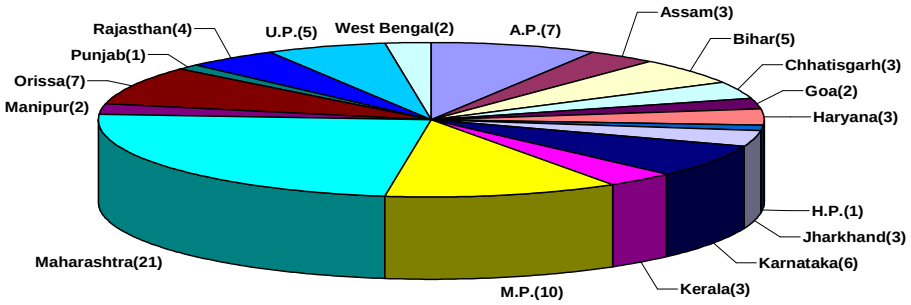
TABLE 8.2 - List of Major Pre-Fifth/ Fifth Plan Projects Under Vigorous Monitoring Completed upto March, 2005

Sl. No.	State	Project	Plan	Completed during
1.	Assam	Bordikarai	V	2003-04
2.	Haryana	Gurgaon Canal	III	2003-04
3.	Madhya Pradesh	Upper Wainganga	V	2003-04
4.	Karnataka	Tungabhadra HLC	II	2003-04
5.	Haryana	Rewari Lift	III	2004-05
6.	Maharashtra	Jayakwadi	V	2004-05
7.	Uttar Pradesh	Madhya Ganga Canal	V	2004 -05

Fig.8.1

MAJOR PROJECTS MONITORED BY C.W.C.

(FIELD UNITS & HEAD QUARTER)



Total Projects - 88

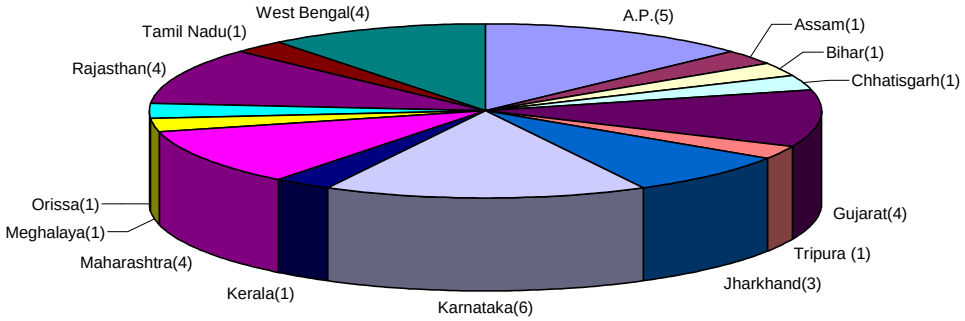
Monitored from HQ - 8

Monitored by Field Units - 80

Fig.8.2

MEDIUM PROJECTS MONITORED BY C.W.C.

(FIELD UNITS)

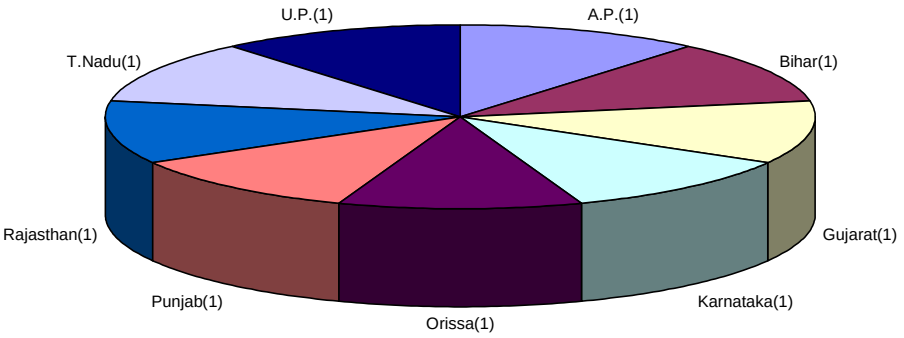


Total Projects - 38

ERM PROJECTS MONITORED BY CWC

(Field Units & Head Quarter)

Fig 8.3



Monitored from HQ - 6

TOTAL PROJECTS - 9

Monitored by Field Units - 3

8.2 Management Information System

CWC maintains a monitoring information system created from data received through quarterly progress reports, which are furnished by the State/Project authorities. This ensures continuous interaction with the implementing agencies to monitor the follow-up action taken by them on the critical activities of construction. Monitoring has significantly contributed towards ensuring achievement of targets and in sorting out various critical issues ranging from construction planning, project staffing, land acquisition problems, quality control aspects etc.

8.3 State Wise Status Reports of Irrigation Development

The Project Monitoring Organisation prepares state wise yearly status reports bringing out the irrigation development through Major and Medium projects in the state, which give an overview of the surface water resources of the state, ultimate irrigation potential, plan-wise irrigation development in terms of potential created / potential utilised & expenditure incurred, land use classification, projects benefiting drought prone and tribal areas, inter-state/externally aided/centrally aided projects in the state, major projects monitored by CWC along with critical issues requiring attention of the State Govt. and other related aspects. These reports are updated upto 2002-03 for all the states and upto 2003-04 for Maharashtra, MP, Chattisgarh and Goa.

8.4 Monitoring of Externally Assisted Projects

World Bank through its soft lending affiliate, the International Development Association (IDA) and IBRD have been providing credit assistance to the Major and Medium Irrigation Projects since long. JBIC (Japan Bank for International Co-operation) has also been funding a few major / medium irrigation projects in the country. While these projects were executed by the States, the need arose for their close monitoring by the Centre for achieving construction and investment targets as per the criteria laid down by the external funding agencies and to remove bottlenecks, if any, encountered during the construction.

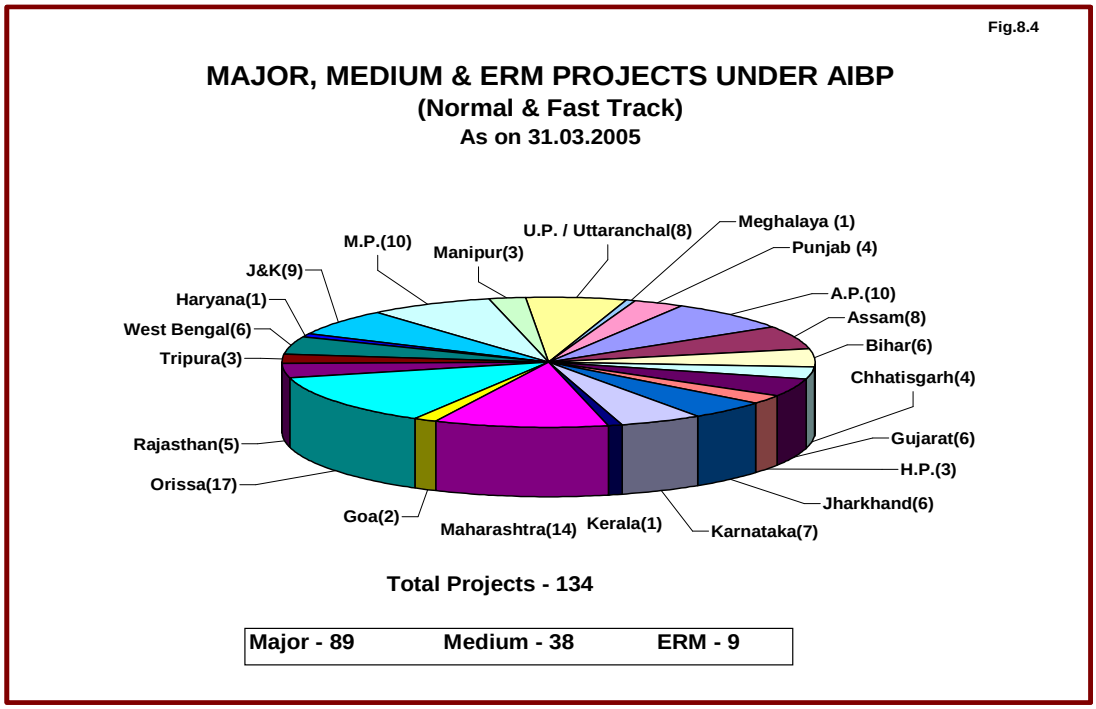
Monitoring of all externally aided schemes has been entrusted to CWC, which includes two "Water Resources Consolidation Projects (WRCP)" in Orissa and Tamil Nadu and two "Water Sector Restructuring Project" in Rajasthan & Uttar Pradesh which comprise several Major and Medium projects covering issues interdisciplinary in nature.

8.5 Accelerated Irrigation Benefits Programme (AIBP)

A special scheme named 'Accelerated Irrigation Benefits Programme (AIBP)' was launched in 1996-97, for providing central loan assistance to the States for accelerating the implementation of large irrigation and multipurpose projects. The loan assistance under this scheme is extended to selected irrigation projects in the country, with the objective to accelerate the implementation of those projects, which are beyond resource capability of the States or are in advanced stage of construction.

The Accelerated Irrigation Benefits Programme is being implemented under the overall charge of MoWR with Central Water Commission having been assigned the responsibility to comprehensively monitor the projects receiving the CLA. Presently, there are 135 ongoing projects under AIBP (both Normal & Fast Track), which are getting the CLA and are being monitored by CWC. State-wise number of projects under AIBP is indicated in Fig. 8.4. The projects under AIBP are visited twice a year by CWC officers and thereafter the status reports are prepared and issued to all concerned.

Fig.8.4



Under this scheme, Central Loan Assistance (CLA) of Rs. 12994.593 crore was disbursed to projects in Major and Medium Sector under normal AIBP during the years 1996-97 to 2003-04. During 2001-02, Fast Track Programme under AIBP was also launched in which 100% balance cost of the projects in advanced stage were proposed to be included. Under Fast Track AIBP, a CLA of Rs 1353.095 crore was released during 2001-02 to 2003-04.

For the year 2004-05, a provision of Rs. 3670 crore was kept in the budget estimate and CLA of Rs. 2773.132 crore (Rs. 2574.577 crore for Normal & Rs. 198.555 crore for fast Track)

was released to 71 major/medium irrigation projects as Central Loan Assistance (CLA) under normal AIBP and 10 major/medium projects under Fast Track AIBP. Overall, 184 Major/Medium irrigation projects have received Central Loan Assistance of Rs. 17120.82 crore (Rs. 15569.17 crore under Normal AIBP & Rs. 1551.65 crore under Fast Track AIBP) since its inception till 31.03.2005. Year wise CLA disbursement under normal and fast track AIBP is given in Table 8.3.

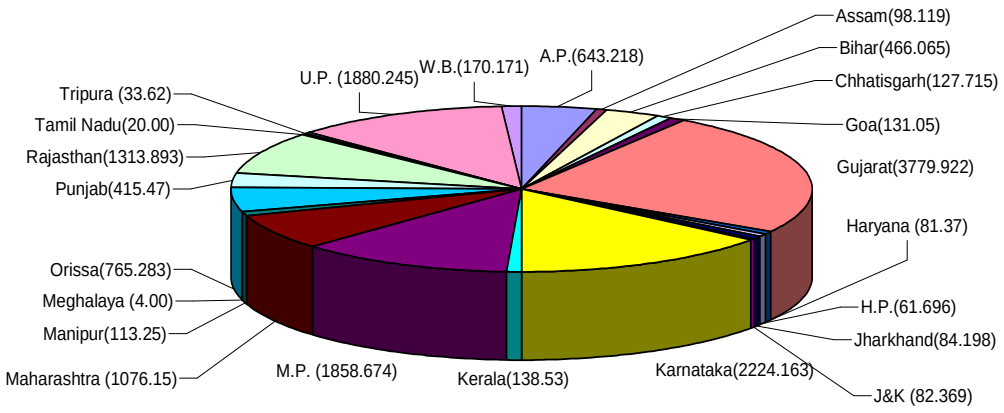
TABLE 8.3 : Year wise CLA Disbursement under Normal and Fast Track AIBP

Year	CLA in Rs. Crores disbursed under		
	Normal AIBP	FTP	Total
1996-97	500.000		500.000
1997-98	952.190		952.190
1998-99	1119.180		1119.180
1999-2000	1392.065		1392.065
2000-01	1791.605		1791.605
2001-02	2081.366	472.860	2554.226
2002-03	2628.283	386.855	3015.138
2003-04	2529.904	493.380	3023.284
2004-05	2574.577	198.555	2773.132
Total	**15569.17**	**1551.65**	**17120.82**

The details of state wise cumulative CLA released under Normal and Fast Track AIBP upto March 2005 are given in Fig – 8.5 & 8.6 respectively.

Fig. 8.5

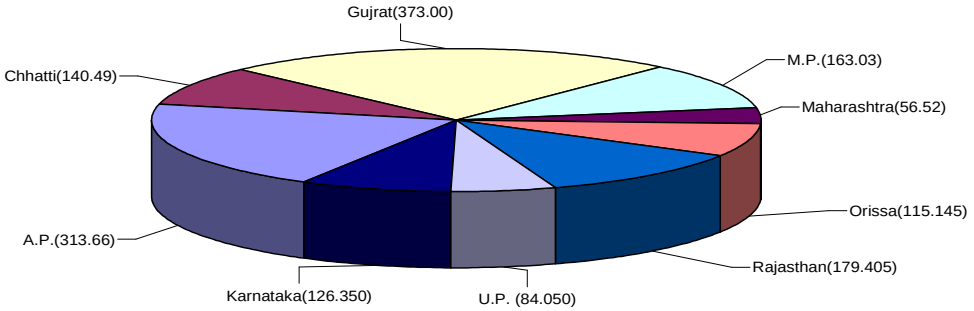
STATEWISE CUMULATIVE CLA RELEASED UNDER NORMAL AIBP
(upto 31.03.2005)



Total CLA Released - 15569.17 Crores

STATE WISE CUMULATIVE CLA RELEASED UNDER FAST TRACK AIBP
(UP TO 31.03.2005)

Fig.8.6



Total CLA Released - 1551.65 Crores

Out of 184 Major and Medium Irrigation Projects that received CLA under AIBP, forty (40) projects have since been completed (Table 8.4) upto March, 2005.

Table 8.4 - Statewise Major & Medium projects completed under AIBP

Sl. No.	State	Project	Sl. No.	State	Project
1.	Andhra Pradesh	Cheyyeru (Annamaya)	21.	MP	Urmil
2.	Assam	Bordikarai	22.		Upper Wainganga
3.		Rupahi	23.	Maharashtra	Jawalgaon
4.	Bihar	Bilasi	24.		Jayakwadi stage-II
5.	Chattisgarh	Shivnath Div.	25.		Kadvi
6.	Gujarat	Damanganga	26.		Kasari
7.		Deo	27.		Kasarsai
8.		Harnav-II	28.		Khadakwasla
9.		Jhuj	29.		Upper Tapi
10.		Karjan	30.	Punjab	Ranjit Sagar
11.		Sipu	31.	Rajasthan	Gambhiri Mod.
12.		Sukhi	32.		Jaisamand Mod.
13.		Umaria	33.		Chhapi
14.		Watrak	34.		Panchana
15.	Haryana	Gurgaon Canal	35.	UP	Gunta Nala
16.	Jharkhand	Latratu	36.		Gyanpur Pump Canal
17.		Tapkara Res.	37.		Madhya Ganga and Upper Ganga Canal Modernisation
18.	Karnataka	Maskinallah	38.		Rajghat Dam
19.	Kerala	Kallada	39.		Sarda Sahayak
20.	MP	Banjar	40.	W.B.	Kangsabati

The number of States benefited from the programme is 24 till March 2005. A total of 171 projects under Normal AIBP and 30 projects under Fast Track AIBP received the benefit of this programme. Considering 17 common projects between Normal AIBP and Fast Track AIBP, the net number of beneficiary projects is 184 upto March 2005. Out of 184 projects under AIBP, as many as 76 projects are benefiting the drought prone areas of the country, including 8 projects benefiting KBK districts of Orissa, creating an irrigation potential of 65.548 th. ha. in KBK districts upto 3/2004. 40 projects have been completed upto March 2005 as a result of AIBP. It is also to be highlighted that, out of these 40 major/medium projects completed so far, as many as 25 projects (7 under vigorous monitoring) were of Pre-Fifth/Fifth Plan period.

Additional irrigation potential created in the country from AIBP schemes from 1996-97 to 2003-04 is of the order of 2.68 Million ha. As a result of AIBP, the achievement of potential created during IX Plan i.e.1997 - 2002 has been higher as compared to the average potential created during previous plans. The potential created during IX Plan is of the order of 4.09 m ha. from Major & Medium Irrigation against the average potential creation of 2.68 Million ha per plan. Potential created during IX Plan from AIBP is 1.65 Million ha, which is 40% of the total potential created during IX Plan.

Comparing the scenario of investment made in AIBP and the corresponding benefits accrued in terms of the cost per ha. of potential created, it is seen that the results are quite encouraging. The total investment in AIBP upto March 2004 including the State share on Major/Medium irrigation projects is of the order of Rs. 21357 crore (CLA released Rs. 12994.60 crore under Normal and Rs.1353.10 crore under Fast Track and corresponding State share Rs. 7009.30 crore). Against this, the potential created in the corresponding period is 2.68 m.ha. Accordingly, the cost per ha of potential creation comes to around Rs. 80,000/-.

8.7 Monitoring of CAD Projects

Centrally Sponsored CAD Programme was launched in the year 1974-75 on the recommendations of the Planning Commission to bridge the gap between the creation and utilization of irrigation potential to optimize productivity/production from irrigated land. Implementation and monitoring of the CAD programme was taken up by CAD Wing of Ministry of Water Resources starting initially with 60 projects. However, the number of projects later went upto 226. In May 1995 the then Hon'ble Minister of Water Resources decided that CWC should take up CAD monitoring and as a result, 22 projects which were otherwise being monitored by CWC under general monitoring, were also taken up for CAD monitoring by CWC. At the instance of MoWR, the number was further raised to 60 projects in the year 1999 and to 69 in the year 2002. CWC field monitoring units are doing the CAD monitoring and monitoring reports are being sent to all concerned. Presently, MoWR has entrusted all the 133 projects under restructured Command Area Development & Water Management Programme (CADWMP) to CWC for monitoring on half yearly basis.

8.8 Repair, Renovation and Restoration of Water Bodies

India has a large number of water bodies spread through out the country, which are age-old and their utility is either reduced drastically or they have become defunct over a period. With a view to restore and augment storage capacities of traditional water bodies and to recover the lost irrigation potential of these existing water bodies having original irrigable culturable area of 40 ha to 2000 ha, which are at present in disuse, Government of India has been approved a Pilot Scheme “National Project on Repair, Renovation and Restoration of Water Bodies directly linked to Agriculture” for estimated amount of Rs. 300 crores for implementation during the balance period of the X five Year Plan. The funding pattern is 3 (Centre):1(State). Water bodies of 16 districts in the states of AP (2), Karnataka (2), Jharkhand (1), Chattisgarh (1), Orissa (2), Rajasthan (2), West Bengal (2), Tamil Nadu (2) and MP (1) with an estimated cost of Rs. 168.294 crores have been included in the scheme at present. The scheme is likely to be launched by the Hon’ble PM in

April, 2005. Funds were released to some states for the year 2004-05 on the basis of approved projects for the states. Proposal received from the State Govt. were examined in CWC field organisations and consolidated proposal of the participating States was sent to MoWR by Planning & Development Organisation of CWC for approval and inclusion in the Pilot project. CWC is also monitoring the implementation of the scheme by the states.

Once the pilot scheme is completed and validated, it will form the basis for launching of the "National Water Resources Development Project" at a much larger scale, which may take 7-10 years for completion. Active community participation is envisaged as a necessary input to ensure optimum utilization of assets and facilities proposed to be created under the scheme and to sustain the scheme on long term basis through involvement of Panchayati Raj Institutions & Water User's Associations (WUAs) for building, operation, monitoring and maintaining the assets and facilities. Catchment area treatment to a limited extent will also form part of this scheme.

CHAPTER-IX

CONSTRUCTION EQUIPMENT PLANNING AND MANAGEMENT

CWC is actively involved in various aspects of construction equipment planning and management which involves techno-economic appraisal of project reports from plant planning angle, consultancy in equipment planning, monitoring the equipment performance, assistance in procurement of equipment and spare parts, man power planning, contract management, costing/estimating and data processing.

9.1 Project Appraisal

During the year, 23 project reports of Irrigation, Power and Multipurpose projects of various states of the country were technically examined from plant planning angle. Out of this, 16 project reports were recommended for acceptance with provision worth Rs. 5591.38 Lakhs in respect of earthmoving and construction equipment. In respect of the remaining 7 project reports, the observations/comments were conveyed to the project authorities for compliance and further review.

9.2 Consultancy

(i) The Project Method Statement for undertaking the study to finalise Construction Methodology and Equipment Planning in respect of Ken-Betwa Link Project was prepared and furnished to Planning circle, CWC, Faridabad. The study is to be undertaken for preparation of Detailed Project Report of the link identified under the Inter-linking of Rivers Programme.

(ii) Assistance was provided for preparation of DPR of Matnar Run-off the River Scheme, Chhatisgarh, to Planning & Investigation Division, CWC Faridabad. The Construction Schedule of the Scheme was reviewed and revised in accordance with the suggestions of CEA and revised bar chart & write-up furnished.

(iii) The technical specifications of Hydraulic Excavator -0.9 cum, backhoe loader-cum-excavator-1 cum/0.3 cum to be procured by Irrigation & Flood Control Department, Govt. of NCT of Delhi were finalized and clarifications on the tenders sought by DGS&D were furnished.

(iv) Preliminary equipment assessment, estimation of progress rates, etc. for the two different alternatives of Main Dam, were carried out in respect of Dibang Multi- Purpose Project (12x500 MW), Arunachal Pradesh.

(v) Assistance was rendered for rate analyses in connection with extension of time limit and revision of rates of various civil works contracts of Sardar Sarovar Project, Gujarat. The rate analysis in respect of one of the contracts, viz., construction of tailrace channel for UGRB powerhouse was examined and observations furnished.

(vi) Assistance was rendered in evaluation of technical bids of the tender for procurement of Diamond Core Drilling Machine and Pump by Planning & Investigation Division, CWC, Faridabad.

(vii) Assistance is being provided to NTPC for execution of two projects in the state of Uttaranchal viz., Loharinag-Pala (4x150 MW) and Tapovan-Vishnugad (4x130 MW) Hydroelectric Power Projects. During the year, construction methods, equipment planning and construction schedule for the contract package for construction of 3 adits to the HRT of theLoharinala HE project were finalized and a write-up on the same furnished.

(viii) Assistance rendered to North Eastern Investigation Circle, CWC Shillong in preparation of chapter on 'Construction Methodology and Equipment Planning' of DPR for Sesseri Multipurpose Project, Arunachal Pradesh. The construction methodology and equipment planning for the project were examined for equipment selection, their output etc. and observations conveyed. Prices of equipment to enable preparation of cost estimate/ analysis of rates were also furnished.

9.3 Monitoring Programme and Utilisation of Equipment.

In order to monitor the utilisation of heavy earthmoving and construction equipment available in river valley projects, CWC collects the data on a quarterly basis on equipment performance. The data are being analysed in P&M Dte. of CMO unit with a view to identify reasons for low performance/utilisation of equipment.

Eight quarterly returns in respect of two projects of Punjab State were received during the year 2004-05 and the same were analysed.

9.4 Disposal of Surplus Equipment and spare parts in water resources sector.

The Irrigation Department of Uttar Pradesh and Uttaranchal have large number of earthmoving and construction equipment and their spare parts lying as surplus/unserviceable with various irrigation projects throughout the State. The State Government of U.P. has constituted eleven and State Govt. of Uttaranchal has constituted two Disposal Committees in which an officer of Central Mechanical Organisation is a member. During the year 2004-05, three meetings of the Committees were held in which reserve prices for 209 items of unserviceable equipment/machinery valued at Rs.37.11 Lakhs were fixed. Representative from CWC participated in these meetings. Assistance is also being rendered in fixation of reserve price of equipment, vehicle and other miscellaneous items of the field formation and head quarter of CWC for disposal.

9.5. Manpower Planning

A report "Expenditure and Employment Statistics in Major and Medium Irrigation Projects (under construction)" which is 9^{th} in the series on manpower planning studies of major and medium irrigation projects has been published and distributed to various concerned offices of Central and State Governments. The draft 10^{th} report in the series on manpower planning has been prepared. CWC is providing necessary inputs from time to time to Institute of Applied Manpower Research (IAMR) under Ministry of Planning and Programme Implementation for various studies on manpower planning.

9.6 Other Activities

(i) In view of the dispute between Government of Uttaranchal and NPCC Ltd regarding performance of NPCC Ltd. in execution of civil works of Maneri Bhali Hydro Electric Project Stage-II (4x76 MW), Uttaranchal, Chairman, CWC held discussions with the concerned officials and reviewed the progress of works. The recommendations for amicable settlement of the dispute were furnished.

(ii) Chief Engineer (CMO) was nominated as member of the committee constituted to consider the proposals for time extension and variations in respect of Chute and Shaft Spillway, Dam and Associated works and HPP Civil Works Package I, II and III in respect of Tehri Project.

The committee held several meetings to discuss the proposals and undertook site visits. The reports in this regard were furnished for consideration of the Board of Directors of THDC.

CHAPTER-X

INTERSTATE MATTERS

10.1 Interstate River Water Disputes

Central Water Commission continues to provide technical assistance to Ministry of Water Resources to settle interstate water disputes among the states amicably through negotiation. During the year, assistance was rendered in respect of the following:

10.1.1 Cauvery Water Dispute

The Tribunal set up for resolving the Cauvery river water allocation dispute in 1990, continued the adjudication proceedings during the year. However, for implementation of the interim orders of the Cauvery Water Dispute Tribunal (CWDT), Cauvery River Authority and a Monitoring Committee under it were constituted in August 1998. The Cauvery River Authority is headed by the Prime Minister and Chief Ministers of the basin states are its members. Secretary, MOWR is the Member-Secretary. The Cauvery Monitoring Committee (CMC) is headed by the Secretary, MOWR and Chief Secretaries of the basin states along with one Chief Engineer from each basin state and Chairman, CWC are its Members. Chief Engineer (IMO), CWC was nominated as the Member-Secretary of the Monitoring Committee.

The Cauvery River Authority (CRA) has so far held six meetings, last being on 10.2.2003. The Cauvery Monitoring Committee has so far held 21 meetings. Four meetings were held during 2004-05; last being on 22.09.2004.

As desired by the CRA in its third meeting, a distress sharing formula has been evolved by a Group of Technical Experts appointed by the Cauvery Monitoring Committee. A composite note on the distress sharing formula has been prepared for placing before the CRA. In the twenty first meeting of CMC held on 22.09.2004, it was decided that the reservations / views, if any, of the States on the distress sharing formula would also be appended to the composite note. The views of Karnataka & Tamil Nadu States have been received. The composite note along with the views of the states is to be placed in the next meeting of CRA.

10.1.2 Ravi & Beas Water Tribunal

The Ravi & Beas Tribunal was constituted on 2nd April 1986, for verification and adjudication of the matters referred on paragraphs 9.1 and 9.2 respectively of the Punjab Settlement in 1985. The Tribunal had submitted its report in January 1987 to the Government. The Central Government as well as the party states of Punjab, Haryana and Rajasthan sought explanation and guidance on certain points from Tribunal under Section 5(3) of the Inter-State Water Disputes Act, 1956. The Tribunal has not submitted its final report to the Government so far due to various reasons.

Meanwhile Haryana has filed a suite during 1995 in the Supreme Court of India in which Government of Punjab and Union of India have been made respondents and prayer made for construction of SYL Canal in Punjab portion. On 15th January 2002, the Supreme Court directed the State of Punjab to continue the digging of SYL Canal portion, which has not yet been completed, and make the canal functional within one year from 15th January 2002.

The Hon'ble Supreme Court also directed the Union Government that if within a period of one year the SYL Canal is not completed by the State of Punjab, then the Union Government gets the work done through its own agencies as expeditiously as possible. The Govt. of Punjab has filed a suit in the Hon'ble Supreme Court on 13.1.03 to seek discharge from the obligation under

the Decree dated 15.1.2002 in view of the changed circumstances and other infirmities and consideration. The Supreme Court in its judgment on 4.6.2004 directed the Union Government to mobilize a Central Agency to take control of the canal works from Punjab within a month. The Court also directed the Govt. to set up an Empowered Committee to coordinate and facilitate the implementation of the decree within a month.

The Punjab Legislature on 12.7.2004 enacted the Punjab Termination of Agreements Act, 2004, which terminates all agreements relating to waters of the rivers Ravi and the Beas including the Agreement dated 31.12.1981, from the date of their execution. President has referred this matter to Hon'ble Supreme Court for its opinion.

The draft paras of the affidavit to be filed by UOI in the matter of Presidential reference dated 22.7.2004 in the matter of 'Enactment of Punjab Termination of Agreement Act, 2004' has been examined by CWC and views sent to MOWR in August, 2004.

10.2 Inter-State meeting on drinking water supply problem in Jagdalpur town in Chhattisgarh

It was reported by Government of Madhya Pradesh (now Chhattisgarh) in 1999 that during the past years post monsoon flows in Indravati river are progressively dwindling due to peculiar phenomenon of diversion of Indravati River through "Jauranalla" a small rivulet which joins Kolab-Sabari River and consequently causing drinking water supply problems in Jagdalpur town and downstream villages in Madhya Pradesh.

As per the provisions of the Godavari Water Dispute Tribunal (GWDT) Award vide Annex-IV under Annex-'A' i.e. Agreement dated 9.12.1975 between the States of Orissa and Madhya Pradesh, Orissa is to ensure at its border with Madhya Pradesh a flow of 45 TMC in Indravati and its tributaries at 75% dependability for use by Madhya Pradesh. However there is no specific stipulation regarding monthly quantum to be made available.

Member (WP&P) took three inter-state meetings of Secretaries of Orissa, Chhattisgarh and Regional Chief Engineers of CWC up to the period May 2002. Important decisions taken were (i) two diversion structures (one across Jauranallah and other across Indravati) would be constructed (ii) sharing the cost at 50:50 basis would be taken up with the respective Governments (iii) the 9.39 TMC water requirement placed by Chhattisgarh State would be re-examined (iv) Government of Orissa would consider taking up repair works of the banks of river Indravati on priority basis and temporary measures for diverting flows into Indravati river as already agreed will continue.

In pursuance of the decision taken during the 4th inter-State Meeting held on 8th April 2003, Chief Engineer (IMO), Chief Engineer, Design, (E&NE) and Director, BCD visited the site and held discussion with the officers of Governments of Chhattisgarh and Orissa during 24-30th April, 2003. Subsequently, Chief Engineer, Design (E&NE) sent a proposal for control structures to both Chhattisgarh and Orissa Governments. An inter-state meeting at the level of Engineer-in-Chief, Water Resources Department, Governments of Chhattisgarh and Orissa was held on 24th December 2003 at Raipur in which, among other points, the water supply problems faced by Jagdalpur Town and downstream areas was also discussed. It was decided in the meeting that CWC would be requested to take up the design work and Chhattisgarh would pay the consultancy charges to CWC. Accordingly, Director, BCD (E&NE), CWC inspected the site of proposed structures in March 2004 and sent the inspection note to both State Governments indicating the field and laboratory investigations to be carried out and data to be collected and supplied for taking up the design work. The required data / information is awaited from the Govt. of Orissa. The Government of Orissa is being pursued by CWC to expedite the information. A site visit was undertaken by CWPRS and CWC officers along with officers of both states from 8-12-2004 to 13-12-2004 and data to be supplied for taking up model studies at CWPRS were listed out and given to both states.

10.3 River Boards Act, 1956

Under Entry 56 of List-I of the Constitution the River Boards Act, 1956 was enacted for the establishment of River Boards for the regulation and development of Inter State River and River Valleys. The Central Government can constitute a River Board under the provision of the River Boards Act, 1956 with the concurrence of the State Governments. The Central Govt. has however not been able to constitute any River Board under this Act so far. The role of the River Boards as envisaged in the said Act is only advisory in nature. The National Committee for Integrated Water Resources Development Plan has recommended the enactment of a new Act called the "Inter State Rivers and River Valley (Integrated and Participatory Management) Act" in place of existing River Board Act, 1956.

10.4 Inter-State Dispute on Mandovi River Basin

Mondovi is an inter-state river originating in Karnataka and after flowing in Goa drains in Arabian Sea. A small portion of Catchment area lies in Maharashtra also. The Government of Karnataka in the past prepared proposal for diversion of Mandovi water outside the basin. Ministry of Water Resources in April 2002 conveyed 'in principle' clearance for diversion of 7.56 TMC of water from Mandovi basin to the adjoining Malaprabha sub-basin (Krishna basin) for drinking water purposes. In view of the strong protest from the Government of Goa, MOWR during September 2002 kept the in principal clearance in abeyance. The Government of Goa also sought for constitution of a tribunal for adjudicating the dispute.

Subsequently, Union Minister for Water Resources took an inter-state meeting during December 2002, during which it was decided that Government of Goa and CWC officials could make joint efforts to reconcile the discrepancies in the data and yield figures and the assessment of yield should be completed by March 2003. Since Government of Goa wanted to scrutinize the runoff data of CWC site from original records, as a special case, MOWR during July 2003 permitted to give all the raw gauge data of Gangim site of CWC to Goa. Government of Goa have informed recently that they have collected data upto May, 2003 and require more time to process the raw data and to hold further discussions with CWC officers before convening any inter-state meeting on the matter. Based on a representation received from MPs/MLCs, Hon'ble Minister (WR) has desired that Secretary (WR) & Chairman, CWC hold talks with officials of Goa and Karnataka. Secretary, MOWR fixed an Inter State meeting on 03.01.2005, which was postponed presumably on the request of Government of Goa.

10.5 Paragodu Project Proposed by Government of Karnataka on Chithravathy River of Pennar Basin

The Government of Karnataka has initiated construction of a minor project on the river Chitravathi, a tributary of the river Pennar, which is an inter-state river (Karnataka and Andhra Pradesh). The project envisages providing drinking water facility to 88 villages and 2 towns by constructing a tank. According to the Government of Andhra Pradesh, the construction of the project will adversely affect the drought-hit Anantapur District in Andhra Pradesh.

A central team led by Member (WP&P), Central Water Commission visited the project site along with the representatives of Andhra Pradesh and Karnataka in June 2003. The matter was discussed to sort out the issues in an inter-state meeting convened by the Chairman, CWC.

Based on the discussions, revised project report was received in January 2004, where project planning. had been done for 90% dependability by the State Govt and the norms for drinking water supply specified by Central Government were not adopted. The State Govt. has been asked to revise the project planning for 95% dependability, adopting drinking water norms as per the norms of Ministry of Urban Development and Ministry of Rural Development of Government of India. The revised report is awaited.

10.6 Control Boards for Interstate Projects

10.6.1 Bansagar Control Board

In pursuance of an interstate agreement among the Chief Ministers of Madhya Pradesh, Uttar Pradesh and Bihar, the Bansagar Control Board was constituted vide resolution of erstwhile Ministry of Agriculture & Irrigation in January, 1976 for efficient, economical and early execution of Bansagar Dam and connected works. The head quarter of the Board is at Rewa (Madhya Pradesh).

The Union Minister of Water Resources is the Chairman of the Board and the union Minister of Power, Union Minister of State for Water Resources, Chief Minister and Minister in charge of Irrigation and Finance of the three states and Minister-in-charge of Electricity of Madhya Pradesh are its members. Chairman, CWC is the Chairman of the Executive Committee of Bansagar control Board.

Bansagar Dam on Sone river, a joint venture of the states of Madhya Pradesh, Uttar Pradesh and Bihar is being executed by Water Resources Deptt., Madhya Pradesh under the directions of the Bansagar Control Board. The Execution of the canals and power systems are being carried out by the respective states independently and works of Power House is being executed by MPEB. The benefits and cost of the dam including land acquisition and rehabilitation are to be shared by Madhya Pradesh, Uttar Pradesh and Bihar in the ratio of 2:1:1.

So far 69 meetings of Executive Committee (EC) have taken place. In 69th meeting held on 18.8.04, committee ratified the decision to wind up the contract of M/s NPCC for work of Spillway Bridge and piers. EC desired to achieve the targeted completion of the project before next monsoon, 2005. EC also desired that if suitable candidate is not made available from states for the post of Secretary, BCB then this post may be encadred in CWES of MOWR.

2nd meeting of Bansagar Reservoir Regulation Committee was held on 20.7.2004 under the Chairmanship of the Chairman, CWC. The Regulation Committee decided that long term 10 daily inflow data of CWC G&D site at Kuldha Bridge located downstream of Bansagar Dam will be collected by CE, Bansagar Project, Rewa and submitted to Director, Reservoir Operation (RO), CWC for arriving at dependable inflow Series at Bansagar for the purpose of preparation of Regulation Manual. It was also decided that during the intervening period, 1/4th of the storage up to crest level will be kept reserved for Bihar and will be released as per requirement of Bihar. In addition, the post monsoon inflows arriving at Bansagar will be released as per downstream requirement.

Director (RO) CWC will prepare the draft Operation Manual on receipt of 10 daily inflow data and the same will be circulated and put up to the Regulation Committee in its next meeting for approval.

10.6.2. Betwa River Board

In accordance with the inter-state agreement of 1973 between U.P. and M.P. decision was taken to constitute a Control Board for the execution of the Rajghat Dam Project, an inter-state project of M.P and U.P. Accordingly, the Betwa River Board was constituted under the Betwa River Board Act – 1976 for efficient, economical and early execution of the project. The headquarter of the Board is at Jhansi (U.P).

The Union Minister of Water Resources is the Chairman of the Board and Union Minister of Power, Union Minister of State for Water Resources, Chief Ministers and Minister-in-charge of Finance, Irrigation and Power of the two states are Members.

Chairman, CWC is the Chairman of Executive Committee (EC) of Betwa River Board. As per Betwa River Board Act 1976 subject to the general superintendence and control of the Board, the management affairs of the Board shall vest in the Executive Committee and the Chairman and other members of the Committee shall assist the Board in such manner as the Board may require. Subject to the rules and the directions of the Board, the Executive Committee may exercise any power and do any act or thing which may be exercised or is done by the Board. Chairman, Executive Committee has been delegated with emergency powers to take decision on urgent proposals, subject to ratification by the Executive Committee in its next meeting.

The construction work of the dam is almost complete except some minor works. 76 meetings of the Executive Committee of BRB have taken place so far. 76th meeting of Executive Committee was held on 01.11.2004 and Committee discussed and approved the financial, technical and administrative matters.

10.7 Interstate Committees

Brief description of activities of some of the important Inter-state committees is given below.

10.7.1 Ghaggar Standing Committee

The Ghaggar Standing Committee was constituted in February 1990 to examine and coordinate irrigation, flood control and drainage works in the Ghaggar basin and lay down priority for their implementation and to accord clearance to individual schemes in the Ghaggar basin from the Inter State angle. The Members of the Committee are from the Ministry of Water Resources, Northern Railway, Central Water Commission and Irrigation Department of the States of Punjab, Haryana and Rajasthan. 15th meeting of the Ghaggar Standing Committee was held on 21-8-2003 under the Chairmanship of Member (RM) at New Delhi. Hon'ble MP's from the co-basin states participated in the meeting. A special meeting was held on 5-1-2004 at New Delhi to consider clearance of schemes for flood protection works on river Ghaggar and Tangri from interstate angle, prepared by Govt. of Punjab to be taken up with funding from NABARD.

To prepare Master Plan of Ghaggar basin a sub-committee was constituted under Ghaggar Standing Committee in its 7th meeting held on 20-8-98. The last meeting of Sub-Committee was held on 17-11-2004 at New Delhi under Chairmanship of Chief Engineer (FM), Central Water Commission. The committee decided that the co-basin states should furnish proper feedback on the proposals of Master Plan and cooperate on the early finalisation of the Master Plan. The matter was pursued with the co-basin states during the year.

10.7.2 Yamuna Standing Committee

The Yamuna Standing Committee was constituted to study the effects on Northern Railway Bridge and other structures on Yamuna against undue increase in maximum flood level in Yamuna at Delhi on account of flood control works upstream, to safeguard the interest of Haryana, U.P. and Delhi against adverse effects of flood control works in any of these areas and to ensure that adequate water way is provided for any new structure built across the Yamuna river.

The Members of the Committee are from GFCC, Northern Railway, Central Water Commission, Ministry of Surface Transport and Irrigation Deptt. of the States of Haryana, U.P. and N.C.T. of Delhi. 67th meeting of Yamuna Standing Committee was held on 27-09-2004 at New Delhi under the Chairmanship of Member (RM), CWC.

10.7.3 Sahibi Standing Committee.

After the unprecedented flood in the Sahibi basin during 1977, affecting large areas in the States of Rajasthan and Haryana and National Capital Territory of Delhi, the Central Water Commission prepared an integrated Master Plan of Sahibi Nadi-Najafgarh Nallah drainage basin. The broad recommendations in the Master Plans were:

(a) Tying of Dhansa bund to High Ground in Haryana territory.
(b) Increasing capacity of Najafgarh drain.
(c) Construction of Masani Barrage in Haryana.
(d) Construction of Ajmeripura Dam in Rajasthan.
(e) Constructions of Supplementary drain in Delhi.

Sahibi Standing Committee was constituted by Ministry of Agriculture and Irrigation, Department of Irrigation vide resolution No. FC-17(1)/70 dated 12-7-78 Under the Chairmanship of Member (RM),CWC representatives of Haryana, Rajasthan, Delhi as members and Director (FM-I) as Member-Secretary to oversee the implementation of all the elements of the Master Plan of Sahibi Nadi-Najafgarh Nallah and to ensure the regulation of flows at control points for the best interest of all concerned States.

The main functions of the Committee are: -

- To finalise details of various proposals included in the Master Plan.
- To oversee the implementation of co-ordinated programme so as to ensure its timely completion.
- To direct regulation of the control structures during critical situations taking into account the interest of various affected areas.
- To examine and approve all future flood control drainage and irrigation (Major, medium as well as minor) projects in all the State, which may affect the hydrological balance in the Sahibi catchment, and all drains feeding the Sahibi Nadi and Delhi area.

As per the constitution of the committee, the meeting of the committee is to be held as and when required. The major achievement of the Committee is that the various problems faced by the State due to the flood in Sahibi basin have been discussed in the meeting specially the construction of Masani barrage in Haryana and proposed construction of Ajmeripura dam in Rajasthan. The 1st and the last (16th) meeting of the Committee was held on 10-8-1978 and 1-11-2001 respectively. During the year, follow-up actions on the decisions taken in the last meeting were continued. After the 16th meeting no fresh issues of any kind were raised by the State Government.

10.7.4 Committee on Special Remedial Works for Flood Protection Embankments of Sutlej and Ravi.

Committee on Special remedial works for the Flood Protection Embankment of the Sutlej and Ravi was constituted in Dec., 1989 by the Ministry of Water Resources under the Chairmanship of Chief Engineer (FM), Central Water Commission to technically examine proposals for special remedial works for Flood Protection Embankment on the Sutlej and Ravi submitted by the Govt. of Punjab after verification of developments in the field to monitor the utilisation by Punjab of the Central Assistance utilised for such works by periodic inspection of ongoing and completed works. The Members of the Committee are from Ministry of Water Resources, CWPRS, Pune, Central Water Commission, Ministry of Defence and Irrigation Department of the States of Punjab. Committee Co-opted members from B.S.F., CPWD and Ministry of Home Affairs during 1996.

Report of the 23rd and 24th meeting held on 11-6-2003 & 9-3-2004 to 12-3-2004 under the chairmanship of Chief Engineer (FMO) was prepared and sent to all the Members of the

Committee and Ministry of Water Resources. 25th meeting of the committee was held at Amritsar from 8th to 11th Feb., 2005.

10.7.5 Joint Operation Committee on Rihand Reservoir

Rihand is a major tributary of river Sone. Rihand Hydro-electric Project (6x50 MW) was constructed by U.P. Government in 1962. The live storage capacity of Rihand reservoir is 5650 MCM at FRL of 268.224 m. The releases from Rihand Power House are utilized for irrigation in Bihar, through the Sone Barrage at Indrapuri. An agreement on sharing of release from Rihand Project was signed between U.P and Bihar in 1973. Ministry of Water Resources set up a Joint Operation Committee for Rihand reservoir in 1992 to formulate guidelines for operation of the reservoir after assessing the water availability in the reservoir, irrigation requirements in Bihar and power to be generated, with a view to meet the requirements of both the states. The Member (WP&P), CWC is the Chairman and Director (RO) is the Member-Secretary of the committee.

Every year, meeting of JOC is normally convened in the month of September to finalise the monthly release pattern from the reservoir after assessing water availability in the reservoir. Two meetings of JOC were held during the year 2004-05 (on 15th October 2004 and 20th January 2005). So far 15 meetings of JOC have taken place.

10.8 Damodar Valley Reservoir Regulation Committee

The regulation of the Damodar Valley Corporation (DVC) reservoirs to meet the requirements of water for various uses like domestic water supply, kharif irrigation, hydel power and industry besides carrying out flood moderation during the monsoon season in accordance with the Regulation Manual accepted by the participating Government has been made the responsibility of CWC as envisaged in the ACT No. XIV of 1948 (accepted by the Dominion Legislature). This task is being successfully carried out as per the directions of the Damodar Valley Reservoirs Regulation Committee (DVRRC) chaired by Member (RM), CWC with representatives each from Govt. of Bihar, Govt. of West Bengal, Govt. of Jharkhand and DVC. Superintending Engineer, Hydrological Observation Circle, CWC, Maithon is the Member-Secretary of the Committee. The day-to-day advice is being issued by the S.E., CWC stationed at Maithon and the actual gate operation is being accordingly done by the Damodar valley Corporation Authority. A total of 110 meetings are held so far. During the year 2004-05, two meetings of the DVRR Committee were held on 28/05/2005 at Ranchi and 8/12/2004 at Kolkata.

10.8.1 Comprehensive System Studies of Damodar – Barakar Basin

A Core Group for Comprehensive System Studies (CSS) of Damodar Barakar basin was formed with Dir (WSE), CWC as the Group-Leader with two members each from CWC, I&W Deptt, Govt. of West Bengal, Water Resources Deptt, Govt of Jharkhand and DVC and SE (HOC), CWC, Maithon & Member Secretary (DVRRC) as the Group-Coordinator.

The first meeting of the Core Group was held in April, 2004 at Maithon for assessment of data availability and scope of the studies etc. As per decision taken in the meeting, data collection and compilation work is under progress.

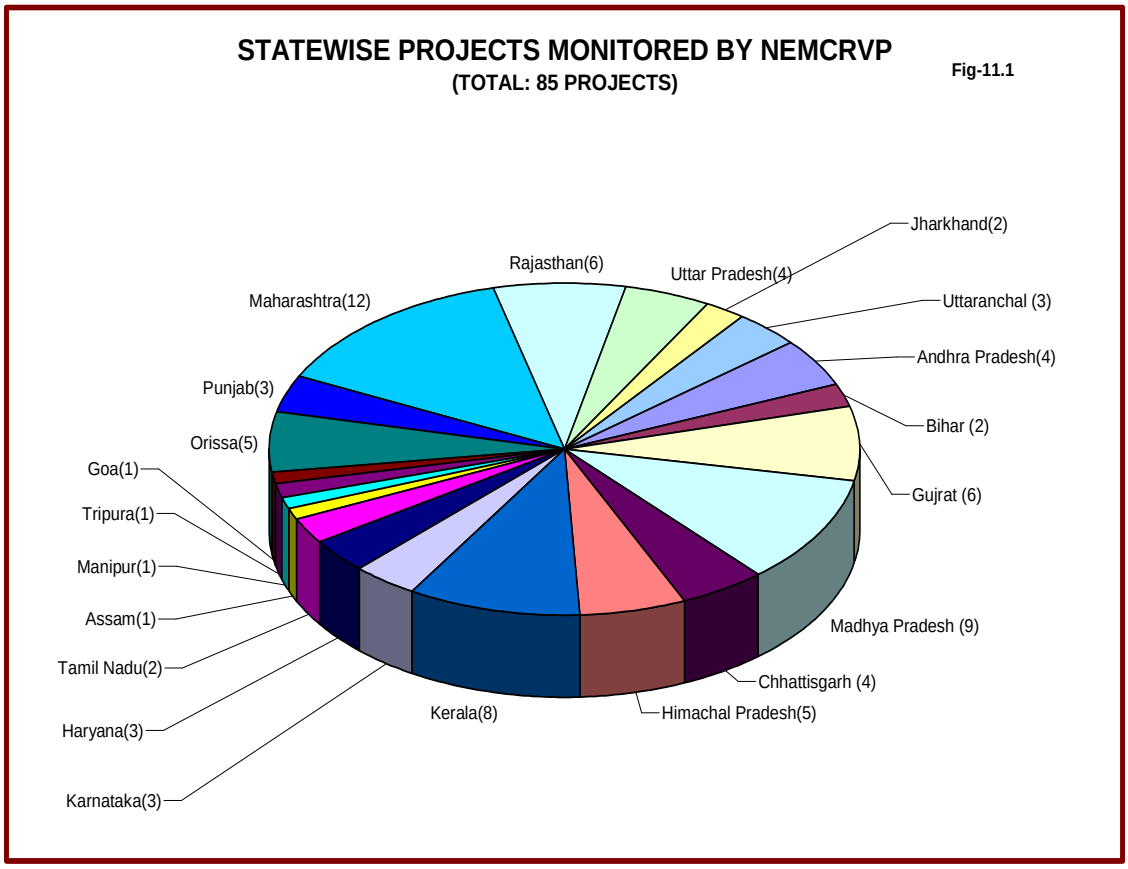
CHAPTER XI

ENVIRONMENTAL MANAGEMENT OF WATER RESOURCES PROJECTS

11.1 Environmental Management

11.1.1 National Environmental Monitoring Committee for River Valley Projects (NEMCRVP)

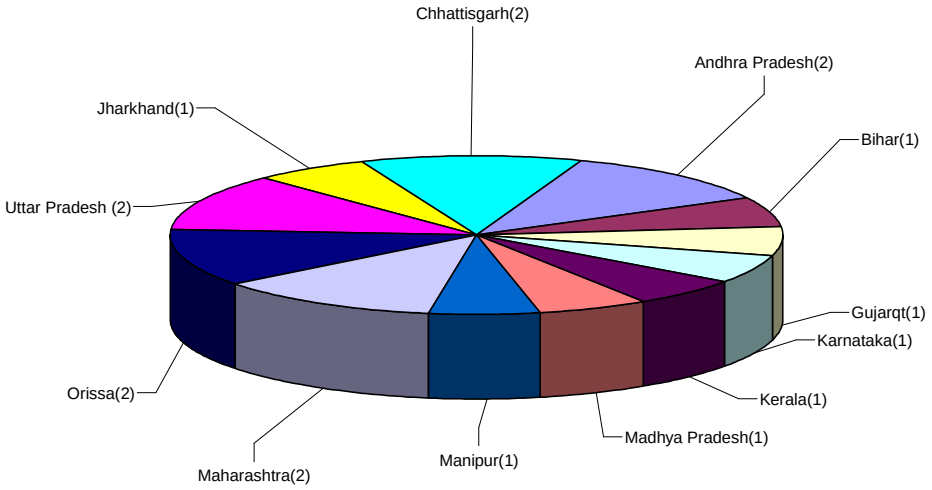
National Environmental Monitoring committee for River Valley Project (NEMCRVP) was constituted in February, 1990 for monitoring the implementation of environmental safeguards of irrigation, multipurpose and flood control projects. The Committee is entrusted with the work to review the mechanism established by the state governments and project authorities, to monitor the implementation of environmental safeguards and to suggest additional compensatory measures in respect of selected 85 projects located in 21 states **(**Fig-11.1**).** Out of these 85 selected projects, 17 are under close monitoring (Fig.- 11.2).



11.1.2 Constitution of NEMCRVP

Member (WP&P), CWC is the Chairman of NEMCRVP. The representatives from Ministries of Agriculture & Cooperation, Environment & Forests, Water Resources, Tribal Welfare besides Planning Commission and CWC are members of the committee. The Chief Engineer (EMO), CWC is the Vice-Chairman and Director (EM) is the Member-Secretary. Environmental Management Directorate, CWC functions as Secretariat.

STATEWSIE PROJECTS UNDER CLOSE MONITORING BY NEMCRVP (TOTAL: 17) Fig 11.2



11.1.3 Functions of the Committee

The NEMCRVP visits the projects and holds meetings with the State Governments and Project Authorities for implementation of environmental safeguards as stipulated in Environmental and forest clearances. The committee has visited 53 WRD projects which includes all the closely monitored projects during last 15 years. It has held 55 meetings since 1990.

It encourages the constitution of State Environmental Monitoring Committee (SEMCs) and Project Environmental Management Committee (PEMCs) and monitors the activities of these committees. As a result of the above, 20 states have already constituted SEMCs under the chairmanship of Secretary; State Water Resources/Irrigation Department. SEMC for the state of Chattisgarh was recently constituted. PEMCs have been constituted for 68 out of 85 projects selected by NEMCRVP. In addition to this, 42 additional PEMCs have also been constituted for other projects. PEMCs play a vital role in the implementation of environmental safeguards stipulated for the Project. Chief Engineer (EMO)/Director (EM), CWC is the Member of the SEMCs whereas Regional Chief Engineer, CWC is the Special Invitee to these committees. Director (Appraisal/Monitoring & Appraisal/Monitoring) of Regional office represent CWC in PEMCs. During 2004-05, CWC officers participated in the three meetings of the SEMCs (one for AP and two for Uttaranchal) and seven meetings of PEMCs (one each for Kol Dam, HP and Waghur, Jayakwadi, Gosikhurd & Tillari Projects, Maharshtra and two for Mahanadi Reservoir project, Chattisgarh)

The progress achieved by the NEMCRVP is being brought out annually in shape of Annual Reports giving details of visits and meetings. The directions given to concerned state and project authorities for implementing the environmental safeguards are highlighted in the annual report. Status Reports on environmental and related aspects is also presented in the Annual Reports.

11.1.4 Activities of NEMCRVP during 2004-05

During 2004-05, NEMCRVP visited the Singur Irrigation Project and Priyadarshini Jurala Multipurpose Project (Andhra Pradesh), and Mahanadi Reservoir Project (Chattisgarh). During these visits, 53rd, 54th and 55th meetings were chaired the by Chief Engineer, (EMO) CWC and Vice Chairman of NEMCRVP.

The Annual Report of NEMCRVP for the year 2003-04 has been published.

11.1.5 Environmental Awareness

Efforts are being made to create awareness about the accelerated development of water resources in eco-friendly manner. Keeping this in view, a training programme on "Effective Assessment, Management & Monitoring of Environmental Safeguards in River Valley Projects" was organised during 13-17, December, 2004. Officers of NHPC, BBMB, THDC, NIH, Govt. of Haryana, Rajasthan, AP etc. participated in the training programme.

11.2 Environmental Impact Assessment

11.2.1 Environmental Impact Assessment (EIA)

Environmental Evaluation Studies of Mahi Project has been completed and the report is being printed. Reports on Jakham Irrigation Project (Rajasthan) and Barapani HE Project (Meghalaya) are under preparation.

A draft manual for “Environmental Impact Assessment and Clearance of River valley Projects” prepared in EIA Directorate is under finalisation.

11.2.2 Appraisal of EIA Reports

EIA Reports of 11 projects for Expert Committee on River valley and hydroelectric projects referred to CWC by Ministry of Environment and Forests have been examined and comments prepared. Seven meetings of the Expert Committee were held and 9 projects have been recommended for environmental clearance.

Feasibility reports/DPRs of 15 projects have been examined from Environmental angle for granting “In principle” consent of CWC and three projects have been given “In Principle” consent.

11.3 Resettlement & Rehabilitation

The Central Water Commission is actively involved in monitoring of resettlement and rehabilitation issues of water resources projects in various states of India especially in Sardar Sarovar Project (Gujarat), Indra Sagar Project (M.P) and Priya Darshni Jurala Project (A.P).

Norms/Act/policies adopted by the State Government on R&R of displaced /affected families of major/medium projects are collected and analysed. So far, 219 existing/ongoing major/medium project data on rehabilitation measures have been collected. A Status Report on R&R Action Plan on Water Resources Project was prepared.

CHAPTER-XII

EXTERNAL ASSISTANCE

12.1 External Assistance for Development of Water Resources

External Assistance flows to the country in various forms; as multilateral or bilateral aid, loan, grants and commodity aid from various foreign countries and other donor agencies. The main source of external assistance in irrigation sector in India has been the International Bank of Reconstruction and Development (IBRD) commonly known as the World Bank and its soft lending affiliate the International Development Association (IDA). In addition to the World Bank, other funding agencies such as International Fund for Agriculture Development (IFAD), United States Agency for International Development (USAID), European Economic Community (EEC), UNDP and Japan Bank of International Cooperation (JBIC) (formerly Overseas Economic Cooperative Fund (OECF)), have also been providing assistance for implementation of irrigation projects. Projects have also been funded through bilateral support of France, Australia, Canada, Germany and the Netherlands. The Ministry of Water Resources and its organizations assist the State Governments in tying up the external assistance from different funding agencies to fill up the resources gaps both in terms of funds and technological update for rapid development of country's water resources.

12.1.1 Role of Central Water Commission

The Important activities of Central Water Commission in externally aided projects are:-

(a) Providing assistance to the State Govts. for preparation of project proposal for getting external assistance for water sector projects.
(b) Techno-economic examination of the projects posed for external assistance and coordination with state and concerned departments/ministries such as CGWB, MoEF etc.
(c) Monitoring of physical and financial progress of externally aided projects and fixing of arbitrators for resolving disputes in the execution of projects.

Central Water Commission is monitoring the progress of Major & Medium Irrigation Projects only. So far, 41 such projects have received assistance from World Bank, 5 from JBIC, 2 from USAID, 1 from IFAD and one from EEC.

12.2 World Bank Assistance

The World Bank continues to be the primary source of external assistance in the Water Resources sector. The World Bank assistance is in the form of credit or loan. The World Bank financing policies for irrigation projects change from time to time. Initially it financed individual irrigation projects and then changed to financing composite projects in which a group of Major, Medium and Minor irrigation projects were financed under a single credit/loan agreement. It then started financing Water Resources Consolidation Projects in which irrigation sector of the whole state was involved under one credit/loan agreement. In 1994 Haryana became the first such state to get Water Consolidation Project finalised followed by Tamil Nadu and Orissa. Now the policy of World Bank has shifted to finance Water Sector Restructuring Projects in which the emphasis is on irrigation sector reforms of the whole state. Rajasthan and Uttar Pradesh are two beneficiary states where water sector restructuring projects were launched in 2002.

12.2.1 Closed Credit/Loan Agreements

Out of 41 World Bank aided projects, 37 projects have been closed and the assistance utilised is as follows:

Table 6.1
Details of the Closed Agreements

Sl. No.	Name of the State	No. of Projects	Assistance in Million US Dollar	
			As per SAR	Utilised
1	Andhra Pradesh	5	825.00	646.13
2	Bihar	2	142.00	158.61
3	Gujarat	7	921.50	805.82
4	Haryana	3	519.00	505.98
5	Karnataka	2	451.00	291.96
6	Kerala	1	80.00	79.08
7	Madhya Pradesh	2	360.00	318.18
8	Maharashtra	4	453.00	480.75
9	Orissa	5	544.90	457.55
10	Punjab	2	294.00	290.06
11	Tamilnadu	3	340.90	268.36
12	Uttar Pradesh	1	125.00	126.76
	Total	**37**	**5056.30**	**4429.24**

In addition to above, credit agreement for Hydrology Project Phase-I under implementation since September, 1995 by nine States and five central organization including CWC was also closed in December, 2003. The total cost of the Project was Rs. 6020 million and CWC component was Rs. 734 million. A proposal for taking up Hydrology Project Phase-II, for a total cost of the project amounting to Rs. 5255.9 million (including Indian component) and CWC component of Rs. 296.3 million (with contingencies) has been agreed by the World Bank in Aug, 2004. Further process for approval of the projects and signing of the agreement is under process.

12.2.2 Water Resources Consolidation Projects

The Water Resources Consolidation projects (WRCPs) are the new generation irrigation projects assisted by the World Bank. The WRCPs deal with the irrigation sector in its entirety and State as a whole to realize the basic objectives postulated in the National Water Policy. The World Bank has extended credit assistance on a larger scale under separate Water Resources consolidation Project (WRCP) individually to three States namely Haryana, Orissa and Tamilnadu, who were the main participants of NWMP-1 .The main objectives of WRCP are:

1. Improving institutional and technical capability of managing the State's water resources
2. Planning of water resources by river basin across all uses of water
3. Improving agricultural productivity through rehabilitation and completion of irrigation schemes and farmers' participation.
4. Assuring sustainability of infrastructure and the environment etc.

12.2.3 Water Sector Restructuring Project

Water Sector Restructuring Project is the latest concept in water resources development and management and are the latest generation irrigation projects being financed by World Bank. Water Sector restructuring projects are planned with the objective to take care of water sector reform, proper implementation of state water policy, creation of apex water institutions and strengthening of multi-sector water resources and environment capacity. At present three such

projects are taken up with the assistance of the World Bank in the state of Rajasthan, MP and Uttar Pradesh and for Maharashtra is in final stages.

The main objectives of WSRP are:-

1. To set up an enabling institutional and policy frame work for water sector reform in the state for integrated water resources management.
2. To strengthen the capacity for strategic planning and sustainable development and management of the surface and ground water resources.
3. To initiate irrigation and drainage sub-sector reforms in the state to increase the productivity of irrigated agriculture through improved surface irrigation system performance and strengthened agriculture support services involving greater participation of users and the private sector in service delivery.

12.2.4 On-going Credits / Loans Agreements

Out of seven ongoing projects, three projects viz Tamilnadu Water Resources Consolidation Project, Orissa Water Resources Consolidation Project, Third Andhra Pradesh Irrigation Project were closed during the year. One new project namely, Madhya Pradesh Water Sector Restructuring Project was launched in Jan, 2005. The assistance utilized is as follows:-

Sl. No	Name of Project	Credit No/Loan No.	Agency	Time Slice		Est. Cost in Rs. M		Assistance in US $ Million (M)	
				Starting Month	Closing Month	Total (As per SAR)	Latest	Total	Utilized ending 03/05
1	2	3	4	5	6	7	8	9	10
1	Tamilnadu Water Resources Consolidation Project	Cr.2745-IN	IDA	12/95	09 / 04	11433.00	10620.00	282.90	201.35
2	Orissa Water Resources Consolidation Project	Cr.2801-IN	IDA	01/96	09/04	14099.98	14275.00	290.90	247.49
3	Third Andhra Pradesh Irrigation Project	Cr.2952-IN Ln.4166-IN	IDA IBRD	07/97	7/04	18897.08	21912.31	150.00 175.00	142.52 106.94
4	AP Economic Restructuring Project	Ln.4360-IN Cr.3103-IN	IBRD IDA	02/99	09/05	11292.00	9622.52	142.00 28.30	105.70 26.41
5.	Rajasthan Water Sector Restructuring Project	Cr.3603-IN	IDA	03/02	03/08	8305.07	8305.07	140.00	28.92
6.	Uttar Pradesh Water Sector Restructuring Project	Cr.3602-IN	IDA	03/02	10/07	8351.00	8351.00	149.20	19.32
7.	Madhya Pradesh Water Sector Restructuring Project	Ln 4750 IN	IBRD	01/05	03/11	20402.23	20402.23	394.02	21.97

12.3 Japan Bank of International Cooperation Assistance

In water resources sector JBIC provides financial assistance to major, medium and minor Irrigation Projects in the form of loans with the objective of increasing production of agriculture by mainly funding construction of civil works in the Irrigation system. The main components of these projects are as follows:-

- Construction of civil work
- Training
- Consulting Services
- Agriculture Intensification Programme
- On-farm development.

12.3.1 Closed Agreements

Out of 5 JBIC aided projects, 2 projects have been closed and the assistance utilised is as follows:

(Amount in ¥ M)

Sl. No.	Name of the State	No. of Projects	Total Assistance (As per Agreement)	Assistance utilised
1	Orissa	2	7513.00	6713.83

12.3.2 On-going Agreements

There are three ongoing project out of which Tranch-I assistance to Rengali Irrigation project and K.C. Canal Modernization project was closed in December 2004 and Feb, 2005 respectively. The assistance utilized is as follows**:-**

Sl. no	Name of Project	Loan No	Time slice		Estimated Cost		Total Assist-ance ¥ M	Assistance utilized ending 03/2005
			Starting month	Closing month	Total as per agreement (Rs. M)	Latest (Rs. M)		
1	K.C.Canal Modernisation Project, A.P.	ID-P-113	03/96	03/09	10336.60	11070.00	20822.	16554.97
2	Rajghat Irrigation project, M.P.	ID-P-126	04/97	05/06	5525. 55	5929.61	13222	9538.85
3	Rengali Irrigation Project Left Bank Canal, Orissa	ID-P-135	02/98	12/07	6579.92	6579.92	14102	7021.55

12.4 European Economic Community Assistance

EEC provides financial assistance to Irrigation Project (major, medium or minor) in the form of grant. The criteria for assistance to the project are as follows.

1. No specific cost
2. Must involve the beneficiaries in project management, operation and maintenance.

One Irrigation project aided by EEC has been closed and the assistance utilized is as follows:-

Sl. No.	Name of the State	No. of Projects	Total Assistance (As per Agreement)	Assistance Utilised
			€ M	€ M
1	Sidhmuk & Nohar Irrigation Project, Rajasthan	1	45.00	39.60

CHAPTER-XIII

INTERNATIONAL COOPERATION WITH NEIGHBOURING COUNTRIES

13.1 Cooperation between India and Nepal

- With a view to discuss important issues pertaining to cooperation in the field of Water Resources, including implementation of existing agreements and understanding, a Nepal-India Joint Committee on Water Resources (JCWR) headed by Water Resources Secretaries of both the countries is functioning with the mandate to act as an Umbrella Committee of all committees and groups. 2nd meeting of Indo-Nepal Joint Committee on Water Resources (JCWR) was held on 7th & 8th October, 2004 at New Delhi to discuss various bilateral issues related to water resources development. Assistance was provided to the MoWR in connection with activities of the Indo-Nepal JCWR and Joint Group of Experts (JGE).

- A treaty on Integrated Development of Mahakali (Sharda) River including Sharda Barrage, Tanakpur Barrage and Pancheshwar Multipurpose Project was signed between the Government of India and Government of Nepal in February 1996, which came into force in June, 1997 (Mahakali Treaty). The Treaty is valid for a period of 75 years from the date of its entry into force. Pancheshwar Multipurpose Project is the Centre piece of Mahakali Treaty. Required field investigations for the Pancheshwar Multipurpose Project having an installed capacity of 5600 MW at Pancheshwar with irrigation and incidental flood control benefits and a re-regulating structure to primarily meet the irrigation requirements downstream of Banbasa in Uttar Pradesh, have been completed. The Detailed Project report (DPR) is to be finalised after mutually resolving the pending issues regarding finalisation of re-regulating dam site, cost apportionment between Irrigation and Power, and between India and Nepal.

  20th meeting of Joint Group of Experts (JGE) regarding Pancheshwar Project was held on 06.10.2004 at New Delhi to discuss outstanding issues for preparation of DPR. As per decision taken in the meeting of JGE, Joint Technical Group (JTG) from Indian and Nepalese side met at Kathmandu on 20th and 21st December, 2004 to discuss technical issues related to Pancheshwar Multipurpose project.

- The Government of India has also been discussing with Nepal the taking up of Joint Investigation of Sapta Kosi High Dam Multipurpose Project and Sun Kosi Storage-cum-Diversion scheme. As per agreed Joint Inception Report, a Joint Project Office (JPO) to take up field investigations and preparation of Joint DPR has been opened in August, 2004 in Nepal. The preparation of Joint DPR is programmed to be completed in a period of 30 months from the date of setting up of JPO. Besides irrigation and power benefits, the above project will also have major flood control benefits particularly in the north Bihar. Field investigations for preparation of DPR are under progress.

- Most of the rivers, which create flood situation in the States of UP and Bihar in India originate from Nepal. These rivers are Ghaghra, Sarda, Rapti, Gandak, Burhi Gandak, Bagmati, Kamla, Kosi and Mahananda. In order to make flood forecasting and advance warning in the flood plains of the above rivers flowing from Nepal, a scheme namely, "Flood Forecasting and Warning system on rivers common to India and Nepal" which includes 42 meteorological / hydrometric sites in Nepal and 18 hydrological sites in India has been in operation since 1989. The data collected is helpful for formulating the flood forecasts and issue of warnings to the downstream of the catchment. The scheme is being reviewed regularly from time to time.

- In pursuance to the decisions taken on the occasion of the visit of the Prime Minister of Nepal to India, a High Level Nepal – India Technical Committee on Inundation problems on Rupandehi (Nepal), /Siddarth Nagar (India) and Banke (Nepal)/Shravasti districts (India) was constituted. The Committee is headed by Commissioner (ER) on the Indian side. One meeting was held during the year at Kathmandu in September, 2004.

13.2 Cooperation between India and China

- In 2002, the Government of India entered into an MOU with China for sharing of hydrological information on Yaluzangbu/ Brahmaputra river in flood season by China with India. In accordance with the provisions contained in the MOU, the Chinese side is to provide hydrological information (water level, discharge and rainfall) in respect of three stations, namely Nugesha, Yangcun and Nuxia located on river Yaluzangbu/Brahmaputra from 1st June to 15th October, every year. The requisite data during the 2004 from 1st June to 15th October was received and utilized in formulation of flood forecasts by Central Water Commission. The Government has also taken up the matter with the Chinese authorities for setting up of additional hydrological stations on Langquinzangbu (Sutlej) and Palongzangbu (Tributary of Yaluzangbu i.e. Brahmaputra) and China has agreed to establish observation site on Sutlej in 2005.

- The course of the river Parechu, originating from the Prangla pass on the boundary between Himachal Pradesh and J&K in China, was reported to have been blocked by a landslide in the Chinese territory in the first week of July, 2004. The breaching of this landslide dam could lead to disastrous situation in the downstream areas in H.P. Keeping the seriousness of situation in view, a multi-disciplinary team comprising of officers from MHA, MoWR, MEA, CWC, GSI and Central Mining Research Institute (CMRI) visited Lhasa from 17-21 September, 2004 to discuss the matter with the Chinese authorities. During the meeting at Lhasa, it was agreed in principle for immediate exchange of information regarding any potential disaster situation having impact on Indian Territory and to examine possibility of establishing telemetry stations at Palongzangbu, Langqunizangbu and Chao Yu rivers.

  The matter was further taken up with the Chinese Govt. through diplomatic channel and as a follow-up, another multidisciplinary team comprising the representatives of MHA, CWC, H.P., GSI, MEA, CMRI and MoWR was constituted by MoWR for visiting and holding discussions with the Chinese authorities to resolve the crisis. The delegation held discussions with the Chinese authorities in Beijing on 27-28 December, 2004. It was agreed that the hydrological data of the lake and the river would be monitored and exchanged with India during the coming monsoon till the crisis is over. It was also agreed that the Chinese side would establish a hydrological station on river Satluj in Tibet in 2005 and exchange the data with India commencing 2006 monsoon season. They also agreed to establish other hydrological stations on Palonzangbu and Lohit thereafter sequentially. It was also agreed that the stability analysis of the landslide dam would be carried out by both sides and possibility of structural measures would be reviewed as a permanent solution to the crisis in a subsequent meeting.

  A 7-Member delegation under the leadership of Secretary (Water Resources) visited Beijing (China) from 16-18th March, 2005 to discuss the situation created due to the blockage of river Parechu and other issues for cooperation in water resources with China. A draft Memorandum of Understanding (MoU) for exchanging hydrological information on Sutlej and other rivers has been finalised which is expected to be signed during the forthcoming visit of Hon'ble Premier of China in April, 2005. CWC provided technical and other inputs on the issue.

13.3 Cooperation between India and Bangladesh

- An Indo-Bangladesh Joint Rivers Commission (JRC) is functioning since 1972 with a view to maintain liaison in order to ensure the most effective joint efforts in maximizing the benefits from common river systems which is headed by Water Resources Ministers of both the countries.

  The existing system of transmission of flood forecasting data on major rivers like Ganga, Teesta, Brahmaputra and Barak during the monsoon season from India to Bangladesh was continued. The transmission of flood forecasting information from India during the monsoon has enabled the Civil and Military authorities in Bangladesh to take up timely flood mitigation measures.

- The Joint observation team stationed at Farakka and Hardinge Bridge conducts joint observation from 1st January to 31st May every year as per procedure and guidelines framed by the Joint Committee on sharing of Ganga/Ganges water.

- The 4th Meeting of Joint Committee of Experts (JCE) on sharing of Teesta waters between India and Bangladesh was held at New Delhi on 27-28 August 2002. The terms of reference for the Joint Scientific Study on the availability and requirement of Teesta waters in both the countries and Interim Agreement for sharing of Teesta water between Bangladesh and India were discussed in detail. The last meeting of JCE was held on 19th & 20th January, 2004 at New Delhi for a logistic solution of sharing Teesta waters.

- Discussions were held with Bangladesh on the unprecedented floods of September 2000, which had affected Southwest Bengal and adjoining areas of Bangladesh. In this connection, a Joint Task Force for Flood management in the Ichhamati Basin was set up to formulate an Action Plan for tackling flood calamities jointly in future and to submit it for consideration of JRC. The Committee has already visited the study areas both in Bangladesh & India and works programme for completion of the studies has been drawn.

13.4 Cooperation between India and Bhutan

- A Joint Expert Team (JET) consisting of officials from Government of India and Royal Government of Bhutan is functioning since 1979 to review the progress and other requirements of the "Comprehensive Scheme for Establishment of Hydro-meteorological and Flood Forecasting Network on rivers common to India and Bhutan". The network consists of 35 hydro-meteorological/ meteorological stations located in Bhutan which are being maintained by the Royal Government of Bhutan (RGoB). The data received from these stations is utilized in India by Central Water Commission for formulating the flood forecasts. The JET meets on regular intervals every year alternatly in India and Bhutan. The scheme is fully funded by the Government of India. During the year, two JET meetings were held, one (XIX) at Phuentsholing on May 17-19' 2004 and the other (XX) at Darjeeling Jan 20-22, 2005.

- The matter relating to problem of floods created by rivers originating from Bhutan and coming to India was taken up with Royal Government of Bhutan. In this connection a Joint Group of Experts (JGE) on Flood Management has been constituted between India and Bhutan to discuss and assess the probable causes and effects of the recurring floods and erosion in the southern foothills of Bhutan and adjoining plains in India and recommend to both Governments appropriate and mutually acceptable remedial measures. The first meeting of JGE was held in Bhutan in November 2004. The JGE had series of discussion and also made several field visits to some of the affected areas which include the sites prone to landslides and dolomite mining areas. Based on their recommendations, the JGE felt that a

more detailed technical examination is required and accordingly agreed to form a Joint Technical Team (JTT) under the Chairmanship of Member (PID), North Bengal Flood Control Commission with representative each from CWC, Geological Survey of India (GSI) and Divisional Commissioner, Jalpaiguri. First meeting of JTT is proposed to be held in April, 2005.

- CWC is also providing technical assistance to RGoB in respect of development of hydro power potential in Bhutan. Bhutan Investigation Division, Phuentsholing is coordinating with RGoB and carring out necessary field works in this respect. During the year, completed works of Chenary Mini Hydel Project were handed over to Royal Govt. of Bhutan. Earlier, in the recent past eight nos. of Mini Hydel Electric Projects executed by CWC were handed over to RGoB. Field investigation for permanent remedial measures for Chukha dam and its associated structures was completed and its design/drawings are under progress. Under the geological and foundation investigation for preparation of DPR of Punatsangchu Hydro-Electric Project 1385m drilling has been completed and balance works are under progress. Formulation and execution of strengthening of River Training Works for the Paro Airport are also under way. Design consultancy for specification/construction stage works of Tala H.E. Project (1020 MW) has also been provided by CWC.

13.5 Cooperation between India and Pakistan

- Under the Indus Waters Treaty 1960, India and Pakistan have created two permanent posts of Commissioners for Indus Waters, one each in India and Pakistan. Each Commissioner is representative of his Government for all matters arising out of the Treaty and serves as the regular channel of communication on all matters relating to implementation of the Treaty. The two Commissioners together form the Permanent Indus Commission.

  During the year 2004-05, the Commission held its 91st meeting in India in May 2004 and its 92nd meeting in Pakistan to discuss Kishenganga Hydroelectric Plant (J&K) in November, 2004. The Commission also undertook its 102nd tour of inspection to certain projects in Pakistan. Besides, three Secretary level talks were also held, first in India during June 2004 to discuss Baglihar Hydro Electric Project, second in Pakistan in July 2004 to discuss the Tulbal Navigation Project (J&K) and the third in India during January, 2005 to discuss Baglihar Hydro Electric Project. CWC officers participated in the meetings and provided necessary technical input for discussions in respect of Baglihar and Kishenganga HE projects, Tulbul Navigation project and other related issues.

- In fulfilment of the requirements of Indus Water Treaty, the daily data of 26 hydrological sites maintained by CWC in Jhelum and Chenab basins of Indus system was sent to Pakistan.

- Flood warning communications were conveyed by India to Pakistan through priority Telegrams, Telephones and Radio Broadcasts for their benefit during the period from 1st July to 10th October, 2004 for Indus system of rivers.

CHAPTER-XIV

COMPUTERISATION AND MODERNISATION

14.1 System Management

The Computer Centre under Information System Organisation continued to provide technical support to various user directorates in application and operational use of standard softwares and upgradation of data bank on water resources and related statistics. The centre also organises training programmes on application and operational use of standard softwares including use of Internet.

14.2 Water Resources Data

14.2.1 Hydrological Data

An integrated centralised data bank of hydrological data for non-classified basins has been created by Hydrological Data Directorate under Information System Organisation to ensure quick availability of the data to the users interested in further analysis of the data. The data bank was updated. Database of classified hydrological data of Ganga and Brahmaputra is maintained by River Data Compilation Directorate.

Under Hydrology Project I, modernisation and computerisation of various field offices were undertaken. A dedicated data storage unit at New Delhi with real time connection to the Regional data centres has been setup. The Meta data of the various peninsular basins is available on line.

14.2.2 Water and Related Statistics

Database containing information on Water and Related Resources such as Rainfall in different Meteorological sub-divisions of the country, Water Resources Potential in the River basins of India, Basin-wise and State-wise Storages in India, State-wise Ultimate Irrigation Potential, Basin-wise Hydrological and Sediment Observation and Water Quality Stations of Central Water Commission, Flood Damages - Area Affected has been created in CWC. In addition to above, information/data indicated below has also been included in the database.

- Resources Utilisation including Plan-wise/State-wise Potential Created, Potential Utilised, Achievements of Irrigation Potential of Major & Medium Irrigation Projects (Surface Water)
- Production Related Performance & Economic Efficiency
- Financial Performance of State-wise and Plan-wise Financial Expenditure on Major & Medium Irrigation
- Social and Environmental performance of Major and Medium Irrigation Projects covered under Tribal Sub-Plan Area (All India Financial Progress and Physical benefits) has been compiled and being updated regularly.

14.3 Documentation of Data

The following publications were finalized/ under finalisation:

(i) Water and Related Statistics- 2004.
(ii) Integrated Hydrological Data Book (Non-Classified Basins) 2003.
(iii) Country Wise Water & Related Statistics for selected countries, 2003.
(iv) Hand Book on Water & Related Information, 2003.

(v) Pricing of Water in Public System in India.

14.4 Computerisation Activities in CWC

Information technology is making rapid strides, and the capabilities and facilities becoming available on desktop are reaching levels that could not have been imagined few years back. The infrastructure for upgradation of Computerisation and Networking in CWC has been developed.

A scheme namely "Up-gradation & Modernisation of Computerisation / Information System in CWC" is operating under the Xth five year Plan. Specific progress made in the implementation of this plan scheme is described below.

a) Hardware Resources:

i) Routing configuration of a 641-node network at Sewa Bhawan and West Block I & II has been done. The existing nodes having network cards have already been integrated and have been provided with internet connectivity through proxy server installed at Sewa Bhawan. IP addressing based on V-LANs has also been established. Internal messaging services on internal mail servers are in place. Users were provided with the useful computerised information, and guidance for working on these facilities including working in Hindi.

ii) Plotter system has been installed in D&R wing for facilitating preparation of drawings on computers.

b) Upgradation of Software and CAD / CAE Technology:

i) Upgradation of Finite Element Analysis facilities and augmentation of capabilities in the field of Non-Linear finite element analysis packages is completed. This includes upgradation / procurement of FEM packages such as NISA, IDEAS, NASTRAN, MARC etc.

ii) After upgradation of Finite Element Analysis facilities and augmentation of capabilities in the field of Linear-Nonlinear analysis which were completed in 2003-2004, A few FE analysis of the Hydro power structures from different directorates of D&R wing were also taken up and completed successfully. I-DEAS software is used for analysing the following problems:

   a. Studies of penstock bifurcation of Tala HEP, Bhutan.
   b. Analysis of Max sluice spill way of Tala HEP for determining best possible location of the construction joints.
   c. Analysis of Max sluice spillway piers of Tala HEP.
   d. Analysis of Bracket for gate in the pier of Tala HEP.
   e. Analysis of Jobat dam for foundation gallery stresses, Madhya Pradesh.
   f. Analysis of intake structure of Bargi dam, Madhya Pradesh.
   g. Analysis of steel and concrete liner of Pykara dam, Tamil Nadu.

iii) Implementation of e-governance package to be made available on CWC Intranet is in progress through Centre for Development of Advanced Computing (C-DAC), which will cover information system for administration, finance, library etc. In the mean time, generation of salary bills, rolls & salary slips in bilingual; expenditure statement (monthly, quarterly, half yearly & yearly); schedules of GPF, HBA & other advances; license fee for Govt. accommodation and other salary related works have been computerised using D-Base program.

Implementation of the Autocad Drafting package has been completed.

CHAPTER - XV

TRAINING

15.0 Training

In order to develop knowledge, technical and managerial skills of CWC personnel, Training Directorate arranges and co-ordinates training programmes/ seminars/ workshops in water related fields for in-service officers of CWC and other Central/State Govt. Departments and their Organisations. These programmes are held both within and outside the country, and officers of CWC are deputed to various National and International seminars, conferences, workshops etc. It also provides support to other professional organisations and societies and co-sponsors some of the National level seminars, conferences, workshops etc. Training Directorate also arranges Apprenticeship Training for fresh engineering graduates/ diploma holders/ vocational certificate holders in collaboration with Board of Apprenticeship Training, Kanpur. A few students of engineering degree courses are given practical training in CWC every year. The training programmes organised during the year are given in Annexure XV-1.

15.1 Induction Training

Induction training to Assistant Directors recruited through UPSC is also being conducted by Training Directorate and National Water Academy at Pune. The 19th Induction training course of 20 weeks duration for the newly recruited Assistant Directors was organised jointly by National Water Academy, Pune and Training Directorate, CWC in which 16 officers participated. This course commenced at NWA, Pune on 6th July, 2004 for 14 weeks duration and remaining 6 weeks training was organised at CWC HQ.

15.2 National Water Academy

National Water Academy (NWA) which was upgraded from Central Training Unit (CTU) during the 9th Plan with the assistance of World Bank under Hydrology Project-I is now functioning as national level training institute for in-service training of water resources engineering personnel.

National Water Academy is imparting training to in-service engineers from Central and State Organizations in various aspects of water resources development planning and management and also developing institutional capabilities at the national level for imparting training in new emerging fields in water resources sector on continuous basis.

The training and other related activities have increased manifold with the development of infrastructure like installation of additional computers, additional classrooms, setting up of library with modern facilities, lodging and boarding facilities for trainee officers and faculties. NWA conducts long term as well as short-term training courses on regular basis and also holds national level seminars and workshops on the emerging technical areas in the field of water resources development and management. .

During the year 2004-05, a total of 22 number of training courses have been conducted for the benefit of 476 officers with a total man-weeks of 1826. NWA has also conducted two workshops during the year 2004-05 on the "Role of R&D in Water Sector" and "Efficiency of Water Resources Systems" attended by 192 delegates.

Out of the above 24 training programmes, following programmes were newly introduced at NWA during the year 2004-05.

- Training Course on Digitization of Maps (for HP Region)
- Training programme on Watershed Development for PWD, Tamil Nadu
- Training Course on WISDOM software
- Training programme on Water Resources Management for Naval Officers

The Advisory Board of NWA under the Chairmanship of Chairman, CWC has been broad based and reconstituted during 2003. This committee consists of the Chairman, CWC, Member (WP&P), CWC, Commissioner (PP), MoWR, Financial Adviser, MoWR, Director General, WALAMTARI, Govt. of AP, Representative of Planning Commission, Director NERIWALM, Tezpur, Assam, Director WRDTC, Roorkee, Director, NIH, Roorkee, Chief Engineer, Bureau of Design & Hydraulics Institute M.P., Director, Gujarat Engg. Research Institute, Chief Engineer & Principal Engg. Staff College, Nasik, Representative form IIFM Faridabad, Vice Chairman, Action for Agriculture Renewal in Maharashtra (AFARM), Vice Chancellor, University of Pune, Executive Director NKVDC or his Representative, Chief Engineer NWA, Pune. The committee is formed for monitoring overall functions and progress of NWA and to advise on its development.

Various training courses, workshops and seminars organised by NWA at Pune during 2004-05 are given at Annexure XV-2.

15.3 Other Training Programmes/Conference/Seminar Etc.

The consolidated details of CWC officers deputed on training, seminars, workshops, conferences etc, within the country and abroad during the year 2004 – 2005 are given below:

Sl. No.	Name of activities	No. of Participants
1	Sponsoring officers for training, attending seminars/ workshops etc. in India organised by other organisations	293
2	Sponsoring officers for training, attending seminars/ workshops etc. abroad	8

15.4 Other Activities

i. CWC engages certain number of graduate/diploma/10+2 passed vocational trainees for a period of one year under Apprenticeship Act 1961. During the year 2004-2005, 68 graduate engineers/ Diploma holders/Vocational Certificate holders were imparted training.

ii. As part of interaction with academic institutions, on the job practical training of 4 to 6 weeks, 50 engineering and secretarial practices students from various institutions were imparted practical training.

iii. Organised lectures on various subjects for the benefit of CWC officers under study circle.

iv. One CWC officer was deputed for undergoing "33rd Postgraduate Diploma Course in Hydrology" at IIT, Roorkee. In addition, three officers were permitted to continue their study for another one year to complete ME Degree.

Annexure XV-1(a)

Courses organized by Central Water Commission during the year 2004-05

Sl. No.	Name of the Course	Duration of the Course	Venue of the Course	No. of Officers/ officials Nominated
1.	Training on Hindi	2-4 June 04.	New Delhi	16.
2.	Training on Hindi	14-18 June, 04	Maithon	36
3.	Training on Hindi	22-24 June, 04	Jammu	30
4.	Wireless Operation	12-16 July, 04	Cudapah (Chennur)	20
5.	O&M Work Shop	26-28 July, 04	Varanasi	30
6.	Trg. on windows Explorer, Internet Explorer& MS Office	23-27 Aug, 2004.	CWC Head Quarters.	15
7.	Hindi Work Shop	1-3 Sep, 04	CWC HQS.	20
8.	Vigilance Administration	13-17 Sep, 04	Nagpur.	27
9.	Pension & other retirement benefits and reservation	22-24 Sep.04.	Vadodra	24
10.	Hindi Word Processing Package	22-28 Sep, 04	CWC Hqs.	8
11.	Advanced computer course including use of internet	06-08 Oct, 04	Lucknow	30
12.	Data Entry in SWDES	25-29 Oct, 04	Guwahati	20
13.	O&M Work shop	25-27 Oct. 04	Noida/Kalindi Bhawan.	30
14.	Importance of Hyd. Data Collection & Presentation	4-5 Nov, 04	Hyderabad	30
15.	Basic Computer Training Course.	16-20 Nov, 04	Bhubaneswar	23
16.	Water Quality	24-27 Nov, 04	Coimbatore	25
17.	Mike 11	7-11 Dec, 04	Guwahati	10
18.	Data Entry and Validation using SWDES & HYMOS	9-10 Dec, 2004	Hyderabad	30

19.	Discharge measurement by ADCP	13-16 Dec, 04	Polavaram (AP)	20
Sl. No.	**Name of the Course**	**Duration of the Course**	**Venue of the Course**	**No. of Officers/ officials Nominated**
20.	Effective assessment, management & Mon. of Environmental safeguards in River valley projects	13-17 Dec, 04	New Delhi	18
21.	Wireless Operation and Maintenance	13-17 Dec, 04	Patna	22
22.	Basic Concepts of GIS for using Dam Safety management with ARC View/Arc Info.	27-31 Dec, 04	Noida	14
23.	Refresher Course on SWDES	3-5 Jan, 05	Bhubaneswar	22
24.	Organisation & Methods workshop with pension & other retirement benefit	4-6 Jan, 05	Gandhinagar	34
25.	Geotechnical Inv.and Foundation Treatmant for River valley projects	10-14 Jan, 05	CWC, Hqs.	18
26.	Training on Hindi	11-13 Jan, 05	NWA, Pune	30
27.	Project Hydrology.	18-25 Jan.05	CWC Hqs.	23
28.	Use of Internet	27-28 Jan, 05	CWC Hqrs	17
29.	Hydrometeorology	7-11 Feb, 05	CWC, Hqrs	20
30.	Use of MIKE II for Flood Forecasting.	15-18 Feb, 05	Hyderabad	10
31.	Modern Technic of Discharge Ob. and Communication of FFC Data by Telemetry System	18-20 Jan, 05	Lucknow	30
32.	Introduction of Hydrometrological Ob. and water quality	14-18 March, 05	Guwahati	13
33.	Operational Use and Application of MS Office	28-31 March, 05	New Delhi	7
			Total	**722**

Annexure XV 1(b)

Participation in various Training/ Seminars/ Symposia/ Conferences and Other Visits Abroad during the year 2004-05

Sl. No.	Topic of Programme/ Venue/ Period	Participant
1.	Training Course on Water Resources and Environmental management in Arid Region, Japan, Technical Cooperation Programme of Government of Japan, 5th April to 1st August, 2004	TD Sharma, DD
2.	102nd Tour of Inspection of the Permanent Indus Commission to Projects/ Sites, Pakistan, 1st to 8th May, 2004	Naresh Kumar, Director
3.	6th Cannes Water Symposium on Man and Water: Reframing Relations as part of Indian Delegation led by Minister (WR), Cannes, France, 27th June to 2nd July, 2004	CB Vashista, Member (WP&P)
4.	Visit for delivering lectures in the International Training Course organized by United Nations University Centre, Tokyo, Japan, 21st to 23rd June, 2004	R Jeyaseelan, Chairman
5.	IWMI/IFPRI- ICID Workshop on 'Country Policy Support Studies of India and China, Moscow, Russia, 3rd to 4th September, 2004	AK Sinha, Director
6.	16th Session of the Intergovernmental Council Meeting of International Hydrological Programme of UNESCO, Paris (France), 20th to 24th September, 2004	DP Singh, Director
7.	International Workshop on Economic, Social and Environmental Impacts of Large Dams, Istanbul (Turkey), 25th to 27th October, 2004	RP Saxena, Director
8.	12th Session of Commission for Hydrology (CHy), Geneva (Switzerland), 20th to 29th October, 2004	SK Das, Member (D&R)

Annexure – XV-2

Courses organized by NWA, CWC, Pune during the year 2004-05

Sl. No.	Name of the Course	Duration of the course	No. of officers/ officials Nominated
(A)	**Training Programmes**		
1.	Induction Training for newly recruited Executive Trainees of NTPC	24th Nov'03 to 23rd April'04	37
2.	First Training Programme on Surface Water Data Entry Software (SWDES)	10th -14th May'04	8
3.	Training Programme on water harvesting and ground water recharging	17th – 21st May'04	23
4.	Training Course on River Basin Management for IMTI Trichy	8th - 18th June'04	20
5.	Training of Trainers in Participatory Irrigation Management	23rd - 30th June'04	27
6.	Nineteenth Induction Training Course for directly appointed Assistant Directors of CWC	6th July'04 to 29th Nov'04	16
7.	Digitization of Maps (HP Region)	7th -9th July'04	8
8.	Environmental Management for River Valley Projects	21st -28th July'04	24
9.	Training Course for M.Tech Civil Engineers of NTPC in Planning & Design of Hydropower Structures	29th July'04 to 27th Aug'04	18
10.	Analysis & Design of Water Resources Structures (under DSO CWC programme) -Hydropower	29th July'04 to 27th Aug'04	12
11.	Training programme on "Watershed Development for PWD, Tamil Nadu"	13th -17th Sept'04	20
12.	Induction Training for NTPC newly recruited civil Engineers	20th Sept'04 to 19th Feb'05	40
13.	Training Course on Geographical Information System – CWC Funding	11th -20th Oct'04	23
14.	Second Training Programme on Surface Water Data Entry Software (SWDES)	1st -5th Nov'04	12
15.	Third Training Programme on Surface Water Data Entry Software (SWDES)	20th -24th Dec'04	23
16.	Training Course on Command Area Development for CWC officers	10th -15th Jan'05	20
17.	Training Programme on WISDOM Software	21st -25th Feb'05	33
18.	Analysis and Design of Water Resources Structures (Under DSO, CWC, Programme) – Concrete, Masonry, Earth and Rockfill Dam	22nd Feb'05 to 18th March'05	20

Sl. No.	Name of the Course	Duration of the course	No. of officers/ officials nominated
19.	Seventh Training Course on Application of RS-GIS Techniques for WRD projects (ISRO Funding)	24th Jan'05 to 3rd Feb'05	25
20.	Water Quality Data Entry (SWDES) for Chemist	28th Feb'05 to 4th March'05	18
21.	Fourth Training Programme on Surface Water Data Entry Software (SWDES)	14th -18th March'05	16
22.	Training programme on Water Resources Management for Naval Officers	21st March'05 to 1st April'05	17
(B)	**Workshops**		
23.	Workshop on Efficiency of Water Resources System	14 May'04	150
24.	Workshop on role of R&D in water sector (NWA & IWRS)	9th -10th Sept'04	42
		Total	**652**

@ 6.7.2004 to 8.10.2004 at NWA, Pune and 13.10.2004 to 29.11.2004 at CWC HQ.

CHAPTER–XVI

VIGILANCE

16.1 Disciplinary Cases

The Vigilance/ Disciplinary cases and complaints received against officers & staff of CWC received proper and prompt attention. During the year 2004-05, 19 complaints were received and taken up for investigation. Investigation was completed in 32 cases (including old cases) and final decision was taken in respect of 29 cases out of which in 11 cases, the officials found guilty were awarded major/minor penalties. The break-up of vigilance/disciplinary cases in respect of different category of officers and staff is as follows:-

Category of Officers/Staff

	Particulars	**Gr.A**	**Gr.B**	**Gr.C**	**Gr.D**
a)	No. of cases pending at the beginning of the year	30	10	45	13
b)	No. of cases added during the year	9	-	7	3
c)	No. of cases in which investigation was completed	15	1	12	4
d)	No. of cases disposed of during the year	12	7	6	4
e)	No. of cases pending at the end of the year (a+b-d)	27	3	46	12

In addition to above, one short term training course on vigilance/disciplinary matters for the benefit of officers and staff of field offices of CWC was conducted at Nagpur from 13.09.2004 to 17.09.2004. Vigilance Awareness Week was observed at CWC HQ during the period 01.11.2004 to 06.11.2004.

16.2 Redressal of Grievances

Effective measures have been taken to strengthen the machinery for the redressal of grievances in respect of the serving persons and the retired persons of CWC. Secretary, CWC has been designated as Staff Grievances Officer to deal with the cases of serving/retired personnel, which are not redressed in the normal channels. Both public grievances and that of Staff are redressed suitably.

The progress made in the disposal of pending grievance cases during the year 2004-05 is as under :-

Pending grievance cases as on 31.3.2004	**Cases received during the year 2004-05**	**No. of cases disposed off during 2004-05**	**No. of cases pending on 31.3.2005**
31	56	29	58

A Complaint Committee was constituted under the chairmanship of a Under Secretary to look into the complaints of women employees working in Central Water Commission at the Headquarter and also in its field formations.

CHAPTER–XVII

REPRESENTATION OF CENTRAL WATER COMMISSION IN VARIOUS COMMITTEES

17.1 Committees Represented by CWC Officers

Chairman, Central Water Commission and Members represent CWC in various Technical Committees of various Organisations either as the Chairman or as a Member. List of various Committees on which Chairman, CWC and Members, CWC represent are given below:

Sl. No.	Name of Committees/Boards/Panel of Experts/Technical Groups etc.	Representation of CWC	
		Officer	Position in the Committee
1	2	3	4
1.	Technical Advisory Committee to the Governing Council for Central Water and Power Research Station, Pune.	Chairman, CWC	Chairman
2.	Technical Advisory Committee of National Institute of Hydrology.	Chairman, CWC	Chairman
3.	Technical Advisory Committee of National Water Development Agency	Chairman, CWC Member (WP&P) Member (D&R)	Chairman Member Member
4.	Group to speed up the process of arriving at consensus amongst the States on the proposals of inter-basin water transfer of NWDA	Chairman, CWC Member (WP&P)	Chairman Member
5.	National Committee on Dam Safety(NCDS)	Chairman, CWC Member (D&R)	Chairman Vice Chairman
6.	Water Resources Division Council (WRDC) of BIS	Chairman, CWC Member (D&R)	Chairman Member
7.	Committee of Technical Experts for advising on the problems relating to O&M of Bhakra Nangal & Beas Project (Irrigation Wing)	Chairman, CWC	Chairman
8.	Working Group of National Water Board	Chairman, CWC Member (WP&P)	Chairman Vice-Chairman
9.	Indian National Committee on Hydrology (INCOH)	Chairman, CWC	Chairman
10.	Indian National Committee on Irrigation and Drainage (INCID)	Chairman, CWC Member (WP&P)	Chairman Member
11.	Selection Committee for i) JAIN-INCID Sookshma Sinchai Puraskar ii) JAIN-INCID Krishi Sinchai Vikas Puraskar	Chairman, CWC	Chairman
12.	Executive Committee of Betwa River Board	Chairman, CWC Member (WP&P)	Chairman Member
13.	Executive Committee of Bansagar Control Board	Chairman, CWC Member (WP&P)	Chairman Member
14.	Regulation Committee of Bansagar Reservoir	Chairman, CWC Member (WP&P)	Chairman Vice Chairman
15.	Standing Committee on Education & Training	Chairman, CWC	Chairman
16.	Committee for expediting Environment/Forest clearance of TAC cleared projects	Chairman, CWC	Chairman
17.	Advisory Board of NWA, Pune	Chairman, CWC Member (WP&P)	Chairman Member

1	2	3	4
18.	Office Council of CWC	Chairman, CWC Member (WP&P) Member (D&R) Member (RM)	Chairman Member Member Member
19.	Joint Panel of ICAR-CWC with the problems relating to optimizing the return from the investment in Irrigation	Chairman, CWC Member (WP&P)	Chairman/ Associate Chairman Member
20.	Joint Group of Experts on Pancheshwar Multi purpose Project	Chairman, CWC Member (RM)	Team Leader Spl. Invitee
21.	Steering Committee for the preparation of Status Report on Water Resources Requirements and its availability for urban areas.	Chairman, CWC Member (RM)	Co-Chairman Member
22.	Governing Council for Central Soil & Materials Research Station.	Chairman, CWC Member (D&R)	Vice-Chairman Member
23.	International Commission on Irrigation & Drainage (ICID)	Chairman, CWC	Vice-President
24.	ICID Working Group on comprehensive approaches to Flood Management (WG-CAFM)	Chairman, CWC	Member
25.	Departmental Council of MoWR	Chairman, CWC	Member
26.	Governing Council for the Central Water and Power Research Station, Pune.	Chairman, CWC	Member
27.	National Institute of Hydrology Society.	Chairman, CWC Member (D&R)	Member Member
28.	Governing Body of National Institute of Hydrology	Chairman, CWC	Member
29.	Monitoring Committee for the National River Conservation Plan (NRCP)	Chairman, CWC	Member
30.	Steering Committee of National River Conservation Plan (NRCP)	Chairman, CWC	Member
31.	Water Quality Assessment Authority (WQAA)	Chairman, CWC	Member
32.	High Powered Review Board of Brahmaputra Board	Chairman, CWC Member (RM)	Member Permanent Invitee
33.	Board of Governors(BOG) of National Institute of Construction Management and Research (NICMAR)	Chairman, CWC	Member
34.	Indo-Nepal Joint Committee on Water Resources	Chairman, CWC	Member
35.	Farakka Barrage Control Board	Chairman, CWC	Member
36.	Sardar Sarovar Construction Advisory Committee	Chairman, CWC Member (WP&P)	Member Invitee
37.	Society of National Water Development Agency	Chairman, CWC Member (D&R) Member (WP&P)	Member Member Member
38. .	Governing body of National Water Development Agency	Chairman, CWC Member (D&R) Member (WP&P)	Member Member Member
39.	National Water Board (NWB) of the National Water Resources Council	Chairman, CWC Member (WP&P)	Member Member-Secretary
40.	High Powered Committee (HPC) on Maintenance of Minimum Flow of River Yamuna	Chairman, CWC	Member
41.	Cauvery Monitoring Committee (CMC)	Chairman, CWC	Member

1	2	3	4
42.	Standing Committee on Water Resources (SC-W) of Planning committee of National Natural Resources Management System (PC-NNRMS) of Planning Commission	Chairman, CWC	Member
43.	Advisory Committee for consideration of Techno Economic viability of Major & Medium Irrigation, Flood Control and Multipurpose project proposals	Chairman, CWC Member (WP&P) Member (RM)	Member Special Invitee Special Invitee
44.	Ganga Flood Control Board	Chairman, CWC	Invitee
45.	Narmada Control Authority	Chairman, CWC	Invitee
46.	Review Committee of Narmada Control Authority	Chairman, CWC	Invitee
47.	Betwa River Board	Chairman, CWC	Invitee
48.	Bansagar Control Board	Chairman, CWC	Invitee
49.	Upper Yamuna River Board	Member (WP&P)	Chairman
50.	National Environmental Monitoring Committee	Member (WP&P)	Chairman
51.	Joint Operation Committee for Rihand Dam	Member (WP&P)	Chairman
52.	Contracts Works Sub-Committee of Betwa River Board	Member (WP&P)	Chairman
53.	Sub-Committee for processing tenders and proposals for purchase of stores & equipments of Bansagar Control Board	Member (WP&P)	Chairman
54.	Sub-Committee of officers to consider the claims of M/s HSCL in Earth Dam- Lot of Rajghat Dam Project	Member (WP&P)	Chairman
55.	Committee for settlement of claims of M/s N.P.C.C. Ltd of Betwa River Board	Member (WP&P)	Chairman
56.	Sub-Committee to examine and process claim cases of contractors of Bansagar Control Board	Member (WP&P)	Chairman
57.	Monitoring committee for non-structural aspects of the proposed Tipaimukh Multipurpose Project	Member (WP&P)	Chairman
58.	Technical Advisory Committee on Socio-Economic, Agro-economic and Environmental Impact studies	Member (WP&P)	Chairman
59.	Screening Committee for selection of arbitrators on Arbitration Boards.	Member (WP&P)	Chairman
60.	Joint regulation committee of Chandil Dam and Galudih Barrage	Member (WP&P)	Chairman
61.	Joint Regulation Committee of Kharkai Dam	Member (WP&P)	Chairman
62.	Sub-Committee on Irrigation, Performance Assessment History, Education, Training, Research & Development	Member (WP&P)	Chairman
63.	Standing Project Appraisal committee of Central Water Commission	Member (WP&P)	Chairman
64.	Water Resources Planning Management and evaluation Sectional Committee-WRD-06 (BIS)	Member (WP&P)	Chairman
65.	Recommendation of National Commission for Integrated Water Resources Development (NCIWRDP) Task Force for reporting guidelines for reporting figures of Irrigation of Irrigation Potential created and utilized in a uniform manner	Member (WP&P)	Chairman
66.	Task Force for Flood Management in the country (North Western Region)	Member (WP&P)	Chairman
67.	Committee for Cost Sharing of Hathnikund Barrage	Member (WP&P)	Chairman
68.	Sub-Group-1 for Research topics under invited reserved Category	Member (WP&P)	Chairman

1	2	3	4
69.	Sub-Group-II Rain Water Harvesting connection in Ground Area for use in Supplementary Canal Water	Member (WP&P)	Chairman
70.	Committee for the Re-organised UP/ Uttaranchal States	Member (WP&P)	Chairman
71.	Committee for Re-organised Bihar/ Jharkhand States	Member (WP&P)	Chairman
72.	Upper Yamuna Review committee	Member (WP&P)	Member-Secretary
73.	Working Group of INCID on capacity building	Member (WP&P)	Member
74.	Working Team on Socio-Economic Impacts & Policy Issues (ICID)	Member (WP&P)	Member
75.	Standing Committee for overall National Perspective Water Planning and Coordination in relation to diverse use of water	Member (WP&P)	Member
76.	Committee constituted by Hon'ble Supreme Court of India in the matter of WP No.914 / 96 (Sector, 14 Resident Welfare Association Noida versus Union of India & Others)	Member (WP&P)	Member
77.	Committee Constituted by Hon'ble Supreme Court of India in matters of WP (Civil) No.725/94. News item in Hindustan Times on "And quiet flow the Mainly Yamuna versus Central Pollution Control Board and others".	Member (WP&P)	Member
78.	Standing Committee on Rural Development (SC-R) of Planning Committee of National Natural Resources Management System (PC-NNRMS) of Planning Commission	Member (WP&P)	Member
79.	Committee for Eastern River Water of Indus System of River	Member (WP&P)	Member
80.	National Watershed Committee	Member (WP&P)	Member
81.	Central Loan Assistance under Accelerated Irrigation Benefits Programme	Member (WP&P)	Member
82.	Steering Committee of Indian National Committee on Hydrology (INCOH)	Member (WP&P)	Permanent Invitee
83.	High Powered Committee-Yamuna Action Plan of Ministry of Environment and forest	Member (WP&P)	Invitee
84.	Technical Advisory Committee for Flood Control, Drainage and Anti-Sea Erosion Schemes (Goa)	Member (RM)	Chairman
85.	Subernarekha Embankment Committee (Orissa , West Bengal & Bihar)	Member (RM)	Chairman
86.	Working Group to advise WQAA on the minimum flow in the rivers	Member (RM)	Chairman
87.	Setting up of HISMG (Technical) for Implementation of the World Bank assisted Hydrology Project Phase – II.	Member (RM)	Chairman
88.	Coastal Protection and Development Advisory Committee (CPDAC)	Member (RM)	Chairman
89.	Ghaggar Standing Committee	Member (RM)	Chairman
90.	Yamuna Standing Committee	Member (RM)	Chairman
91.	Sahibi Standing Committee	Member (RM)	Chairman
92.	Damodar Valley Reservoir Regulation Committee	Member (RM)	Chairman
93.	WRD 01 Sectional Committee of BIS for Fluid Flow Measurements	Member (RM)	Chairman

1	2	3	4
94.	Sub-Committee-III (Flood Management, Drainage and Environment Impacts) of INCID	Member (RM)	Chairman
95.	Joint Team of Experts (JTE) on Sapta Kosi Project	Member (RM)	Team Leader
96.	National Level Steering Committee for Implementation of World Bank assisted Hydrology Project Phase-II	Member (RM)	Member
97.	Setting up of HISMG (Data and Data Dissemination) for Implementation of the World Bank assisted Hydrology Project Phase –II.	Member (RM)	Member
98.	National Coastal Zone Management Authority (NCZMA)	Member (RM)	Member
99.	Apex Committee constituted under the Chairmanship of Hon'ble Chief Minister of Delhi to recommend, supervise and co-ordinate flood control measures in the NCT of Delhi	Member (RM)	Member
100.	Flood Control Board set up by the Irrigation and Flood Control Department of Govt. of NCT of Delhi	Member (RM)	Member
101.	Committee for Flood Control Works in Brahmaputra Valley	Member (RM)	Member
102.	Standing Committee to Brahmaputra Board	Member (RM)	Member
103.	Brahmaputra Board	Member (RM)	Member
104.	West Bengal State Committee of Engineers	Member (RM)	Member
105.	Ganga Flood Control Commission	Member (RM)	Member
106.	Kosi High Level Committee	Member (RM)	Member
107.	Committee for examination of technical issues regarding Baglihar Hydro-Electric projects on the Chenab Main in J&K	Member (RM)	Member
108.	TAC to Assam State Brahmaputra Valley Flood Control Board	Member (RM)	Member
109.	TAC to Cachar Flood Control Board (Assam)	Member (RM)	Member
110.	State Technical Advisory Committee-Floods (Karnataka)	Member (RM)	Member
111.	Standing Technical Advisory Committee (STAC) to the Governing Council for CSMRS, New Delhi.	Member (D&R)	Chairman
112.	Technical Advisory Committee of the Farakka Barrage Project.	Member (D&R)	Chairman
113.	Committee for monitoring the progress of Farakka Barrage Project.	Member (D&R)	Chairman
114.	Committee for monitoring structural aspects of proposed Tipaimukh Multipurpose Project.	Member (D&R)	Chairman
115.	Indian National Committee on Hydraulic Research (INCH)	Member (D&R)	Chairman
116.	R&D Implementation and Monitoring Committee(RIMC)	Member (D&R)	Chairman
117.	National Committee on Seismic Design Parameters of River Valley Projects (NCSDP)	Member (D&R)	Chairman
118.	Civil Engineering Division Council (CEDC) of BIS	Member (D&R)	Member
119.	WRD 09, Dams & Reservoir Sectional Committee of BIS	Member (D&R)	Chairman

1	2	3	4
120.	WRD 15, Hydro-electric Power House Structures Sectional Committee	Member (D&R)	Chairman
121.	Technical Advisory and Review Committee (TARC) for preparation of PMP Atlas	Member (D&R)	Chairman
122.	Technical Co-ordination Committee (TCC) for Tala HE Project, Bhutan.	Member (D&R)	Co-Chairman
123.	World Meteorological Organization	Member (D&R)	Advisor
124.	NHPC Performance Review Committee	Member (D&R)	Member
125.	Research Advisory Committee (RAC) of National Council for Cement and Building Materials.	Member (D&R)	Member
126.	Governing Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
127.	General Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
128.	Science and Technology Advisory Committee (STAC)	Member (D&R)	Member
129.	Board of Management of Geological Survey of India	Member (D&R)	Member
130.	Board of Consultants for Koyna Dam and its appurtenent works and Generating Equipment/Machinery including Koyna Power	Member (D&R)	Member
131.	Board of Directors Satluj Jal Vidyut Nigam Ltd. (SJVNL)	Member (D&R)	Part Time Director
132.	Board of Directors Tehri Hydro Development Corporation Ltd.	Member (D&R)	Part Time Director
133.	Committee of CEA to accord of techno-economic appraisal of Power Schemes.	Member (D&R)	Permanent Special Invitee
134.	Board meeting of Tala H.E. Project Authority (THPA), Bhutan	Member (D&R)	Invitee

17.2 Activities of Some Important Committees

17.2.1 TAC Of NWDA

Chairman, CWC is the Chairman of the Technical Advisory Committee (TAC) of NWDA and Member (WP&P) and Member (D&R), CWC are Members of TAC of NWDA. 33rd meeting of TAC was held on 2nd September 2004. In the meeting, the technical aspects of following seven feasibility reports were discussed:

i) Feasibility report of Par-Tapi-Narmada link project.
ii) Feasibility report of Ken-Betwa Link Project.
iii) Feasibility report of Godavari (Polavaram)- Krishna (Vijayawada) link project.
iv) Feasibility report of Krishna (Srisailam)- Pennar link project
v) Feasibility report of Krishna (Nagarjunasagar)- Pennar (Somasila) Link Project
vi) Feasibility report of Parbati – Kalisindh – Chambal Link Project.
vii) Feasibility report of Krishna (Almatti) – Pennar link Project.

In addition, the status of different preliminary water balance studies pertaining to peninsular rivers development component as well as Himalayan rivers development component were reviewed during the meeting.

17.2.2 Technical Advisory Committee of NIH

The Research Programmes and other Technical activities of NIH are monitored and guided by Technical Advisory Committee of NIH headed by Chairman, CWC. Member(D&R) and Chief Engineer, Hydrological Studies Organization are its Members. TAC gets feedback from 3 Working Groups on Surface Water, Ground Water and Hydrological Observation and Instrumentation. Chief Engineer, HSO and Chief Engineer, BPMO are the Members of the Surface Water Group and Chief Engineer (P&D), CWC is the Member of the Hydrological Observations and Instrumentation Group.

The combined meetings of three Working Groups were held on 20-21st February, 2004 and 26-27th October,2004 and decisions taken on further research programmes.

17.2.3 Technical Advisory Committee of CWPRS

The TAC was constituted mainly for the purpose of providing an overall perspective and technical guidance in the area of hydraulic research. The TAC is composed of 17 members drawn from various public Institutions and is headed by Chairman, CWC. Member (D&R), CWC is one the Members of TAC. 27th Meeting of TAC was held on 28th January, 2005 at Pune wherein progress of research programme for CWPRS for 2004-05 was discussed and programme for the year 2005-06 was finalized.

17.2.4 Technical Advisory Committee of Farakka Barrage Project

The TAC of Farakka Barrage Project is headed by Member (D&R), CWC, which generally meets once every year and takes decisions about various works to be executed for efficient and safe functioning of the project. Various problems, special studies and related design work were referred to D&R wing from time to time. Member (D&R) held discussions with the Farakka Barrage Project authorities from time to time and chaired the Technical Advisory Committee meeting of Farakka Barrage Project at Kolkata on 21st February, 2005.

17.2.5 Standing Technical Advisory Committee of CSMRS

The STAC was constituted mainly for providing an overall perspective and guidance in technical scrutiny of research schemes being done at CSMRS. The STAC is composed of 11 members drawn from various public sector institutions and is headed by Member (D&R), CWC. Last meeting of STAC was held on 18th February, 2005 at New Delhi wherein the work progress of the research station for the year 2004-05 was discussed and programme for the year 2005-06 was finalized.

17.2.6 Indian National Committee on Hydraulic Research (INCH)

INCH is one of the five Indian National Committees (INCs) constituted by the Ministry of Water Resources to promote research work in the field of hydraulic structure and river hydraulics, environmental hydraulics, drainage and reclamation, coastal and estuarine hydraulic and hydraulic machinery. INCH is entrusted with the promotion and funding of research work in the above fields. During the year, one meeting of INCH Sub Committee on "*Hydraulic Structure and River Hydraulics*" was held on 4th October, 2004 at New Delhi in which four research schemes were discussed.

13th meeting of INCH and 4th R&D session were also held on 17th and 18th January, 2005 at WALAMTARI, Hydrabad in which six research schemes were discussed in the R&D session.

17.2.7 Indian National Committee on Hydrology (INCOH)

The Indian National Committee on Hydrology (INCOH) was constituted by the Ministry of Water Resources in the year 1982. It is an apex body with the responsibility of coordinating the various activities concerning hydrology in the country. The Chairman, Central Water Commission is the Chairman of the Committee with the members drawn from Central and State Governments as well as experts from academic and research organizations besides a few members drawn from non-Governmental professional associates. The committee gets a feed back from states and coordinates activities at state level through state co-ordinators.

INCOH plays an active role for implementation of UNESCO sponsored International Hydrological Programme (IHP). The Committee normally meets twice a year, the 27th and the 28th meetings were held on 30.4.2004 and 1.12.2004 respectively at New Delhi.

17.2.8 Indian National Committee on Irrigation And Drainage (INCID)

Indian National Committee on Irrigation and Drainage (INCID) was constituted in 1990 by Ministry of Water Resources. The Chairman, CWC is the chairmanChairman of INCID and Member (WP&P) is one of its members. The secretariat of INCID is located at New Delhi. The INCID pursues the mission and activities of ICID in India. It also looks into the R&D activities in Irrigation and Drainage sectors. To promote research schemes and for their expeditious processing and monitoring, following four Sub-Committees of INCID have been constituted:

(i) Irrigation Performance Assessment, History, Education, Training, Research and Development;
(ii) Crops, Water Use and drought management, Micro and Mechanized Irrigation
(iii) Flood Management, Drainage and Environmental Impacts, and
(iv) Construction, Rehabilitation and Modernisation Operation, Maintenance and Management.

The activities of INCID during the year are given below:

- The 8th meeting of INCID Sub-Committee-I on Irrigation Performance Assessment, History, Education, Training, Research and Development was held on 24th September, 2004 at New Delhi under the chairmanship of Shri C.B. Vashishta, Member (WP&P), CWC. and Chairman of the Sub-Committee. During the meeting, three ongoing and three new research schemes were discussed. The Committee also decided to invite research on the topic "Socio economic and. policy research in relation to water management including gender issues" under invited research category.
- INCID Sub-committee-III on Flood Management, Drainage and Environmental Impacts convened 7th meeting on 23.11.2004 at New Delhi under the chairmanship of Member (RM), CWC to examine various R&D proposals for funding by MOWR and to review the progress of schemes already sanctioned. Committee reviewed the status of six ongoing research schemes. Three new proposals were accepted in principle for recommending to the MOWR. The Completion report of two projects were also accepted by the Committee.
- The two Sub-Groups and one Working Group constituted to deal with the various topics under the category of "Invited Research" have put in relentless efforts in processing research schemes in areas of immediate importance such as in Bio-drainage, Rainfall-Runoff relationship and groundwater dynamics and impact analysis of watershed development works. The schemes were also reviewed in the 5th R&D Session held at Bangalore in February, 2005, attended by more than 70 technical personnel, where 24 ongoing research schemes were presented and discussed.

- The 5th meeting of INCID Working Group on Bio-Drainage was held on 2nd March, 2005 at New Delhi under the chairmanship of Shri A.S. Dhingra, Commissioner (CAD), Ministry of Water Resources and Chairman of the Working Group. In this meeting, six research schemes were accepted for recommending to MOWR for funding.
- During the year, INCID has also brought out important document namely "Irrigation Acts of the States of North India" in two parts (part-I: Punjab \and Uttar Pradesh including Uttaranchal and Part-II: Himachal Pradesh and Jammu and Kashmir) in addition to regular publication of the Quarterly Newsletters - "INCID NEWS" and Annual Report - for dissemination of its activities.
- INCID had instituted the "JAIN-INCID AWARDS" to encourage institutions, engineers, scientists, agriculturists, economists etc. who have made outstanding contribution in the fields of irrigation and drainage. The award is given to institutions and individuals in alternate year.

17.2.9 World Water Council

The World Water Council (WWC) is an International Organisation, which makes and approves the Policy on water. The Central Water Commission (CWC) is a Member of this organisation. A centre of WWC has been set up in New Delhi to promote the activities of WWC in India. Global Water Partnership (GWP) is an International Organisation, which is semi-official in nature and discusses the policy papers on water at global level and then puts it to WWC for further consideration. Indian National Committee on Irrigation and Drainage (INCID) is a Member of GWP from India. There is one regional water partnership for South Asia Region with a Technical Advisory Committee for South Asia Region (SASTAC). At country level, a Non-Governmental Organisation has been formed which is named as India Water Partnership (IWP). CWC is represented in the Steering Committee of IWP. The Chairman, CWC is one of the Members of this Steering Committee. Irrigation Planning (South) Directorate functions as a nodal directorate for all the works related to World Water Council.

One of the important activities of the New Delhi Centre of World Water Council is organisation of brainstorming sessions. Some of the important subjects discussed in the brainstorming session during the year include Environment Database in India, India's Water-Development and Management for the future etc.

17.2.10 International Commission on Irrigation and Drainage (ICID)

This is a non-governmental organisation with representation from more than 80 countries with Head Quarters at New Delhi. India is one of the founding Members of the ICID. The mission of the International Commission on Irrigation and Drainage is to stimulate and promote the development of arts, science, techniques of engineering, agriculture, economics, ecology and social sciences in managing irrigation drainage, flood control and river training applications including research and development and capacity building, adopting comprehensive projects and promote state-of-the-art techniques for sustainable agriculture in the world.

- **Committees/Working Groups under ICID**

Various committees/Working Groups have been constituted by ICID on which the CWC officers are represented to promote the above activities

Sl.No.	Name of the Committee	Member
1.	Permanent Committee on Strategy Planning and Organisational Affairs (PCSPOA)	Shri R.Jayaseelan, Chairman, CWC & INCID
2.	Permanent Committee for Technical Activities (PCTA)	Shri R.Jayaseelan, Chairman, CWC & INCID

Sl.No.	Name of the Committee	Member
3.	IPTRID Advisory Committee (AC-IPTRID)	Shri S.K. Chaudhary, Commissioner (MI), MOWR
4.	Working Group on Comprehensive Approaches to Flood Management (WG-CAFM)	Shri R.Jayaseelan, Chairman, CWC & INCID
5.	Working Group on History of Irrigation, Drainage and Flood Control (WG-HIST)	Shri B.D. Pateria, Chief Engineer, (PO&MI), CWC
6.	Working Group on Environmental Impacts of Irrigation, Drainage and Flood Control Projects (WG-ENV)	Shri M.E.Haque Commissioner (PP), MOWR
7.	Working Group on Capacity Building, Training and Education (WG-CBTE)	Shri S.K. Das Member (D&R), CWC

- Professionals from Egypt, Mexico and Pakistan met Chairman, CWC & INCID and Vice-President, ICID on 15th December, 2004. During the meeting, presentations were made by the experts and delegates shared their experiences and progress of their country with the Indian experts.

- **Executive Council of ICID**

The 55th International Executive Council (IEC) meeting of ICID and Inter Regional Conference on Food Production & Water were held from 5th to 11th September 2004 at Moscow, Russia. Shri R. Jayaseelan, Chairman, CWC & INCID attended the council meeting as one of the Vice-Presidents of ICID. Shri R. Jayaseelan, Vice-President is allocated the region/National Committees of South Asian countries covering Australia, Bangladesh, Pakistan, Sri Lanka, Myanmar and India.

- **Watsave Award 2004**

Search & Selection Committee comprising of Member (WP&P), CWC, CE (IMO), CWC and CMD (WAPCOS) processed the nominations received. Shri S. V. Sodal, Secretary (CAD), Irrigation Department, Mumbai was declared the winner of the "Innovative Water Management Award (WATSAVE 2004)" of ICID.

17.2.11 ICAR - CWC Joint Panel

The ICAR- CWC Joint Panel was constituted for the first time in March, 1979 by the ICAR for a period of three years mainly to deal with the problems relating to efficient water use management and suggest measures for maximizing the return from investment on irrigation in areas covered under major, medium, minor and other irrigation programmes. The functions of the Panel include providing adequate and efficient agricultural research, education and extension services in irrigation commands. The Panel also reviews the work done by Agricultural Universities/ Research Institutes, Command Area Development Authorities, Central and State Ground Water Organisations and others with a view to optimizing the yield per unit of water. The Joint Panel, after expiry of its term of three years, was further reconstituted seven times so far. The present Panel was reconstituted in September, 2003. Director General, ICAR and Chairman, CWC are the Chairman of the Panel in alternate years.

The first meeting of the reconstituted Joint Panel of ICAR and CWC was held on 1st October 2004 under the Chairmanship of DG (ICAR). Chairman, CWC, attended the meeting as Associate Chairman of the Panel, along with other officers from CWC. Some of the major issues discussed in the meeting include:

i. Benchmarking of the irrigation efficiencies in selected irrigation commands.

ii. Promotion of conjunctive use of surface and ground water under water scarcity condition
iii. Studies related to ground water recharging.
iv. Reducing seepage losses through canal lining with new polymeric fabric and other low cost lining materials.
v. Developing large-scale participatory farming system models.
vi. Controlled drainage and bio-drainage in selected waterlogged and coastal irrigation commands.
vii. Dissemination of irrigation water management technologies through demonstration/ training in identified major irrigation projects.

17.2.12 Bureau of India Standards (BIS)

Central Water Commission being an apex technical body in the water resources sector, has been playing an important role in formulation of standards in field of Water Resources Development and Management and allied areas through its participation in activities of Water Resources Division (WRD) and Civil Engineering Division (CED) of BIS. Chairman, Central Water Commission is presently the Chairman of Water Resources Division Council (WRDC). Member (D&R), CWC and Chief Engineer, Designs (NW&S) are the Principal and Alternate Member in Civil Engineering Divisions Council (CEDC). CWC is involved in all the 21 Sectional Committees under WRDC. Out of 41 Sectional Committees under Civil Engineering Division, CWC is involved in 9 Sectional Committees. During the current financial year, 5 Indian Standards under Sectional Committee WRD-01 were approved by Chairman, CWC/WRDC, for adoption and printing and 3 Standards under Sectional Committee TC-113 were reviewed. In addition, 8 amendments permitting use of fly ash in cement in water resources projects and 11 amendments in respect of Sectional Committee WRD-8 were also approved. Chief Engineer (BPMO), CWC participated in the meeting of ISO TC/113 and its sub-committee during 17th to 21st May, 2004 at Tsukuba, Japan.

CHAPTER – XVIII

PUBLICITY AND PUBLICATIONS

18.1 Printing and Publication

The offset press in the Publication Division of Technical Documentation (TD) Directorate carried out various printing jobs for CWC & MOWR. About 5499 pages were composed and 1,28,545 copies of various publications/ forms were printed during the year. The press also carried out binding/ trimming works for publications and reports etc.

The publications/ reports/ journals/ pamphlets/ folders printed and brought out during the year 2004-05 are given below:

S.No.	Name of Publication/Job
1.	National Environmental Monitoring Committee on River Valley Project- Annual Report 2003-04 (English)
2.	Water Profile of Selected Countries
3.	Guidelines for strengthening repair and remedial measure during Planning & construction of Concrete Gravity Dams
4.	Hydrological Observation Stations in India
5.	माननीय राष्ट्रपति जी के राजभाषा संबंधित प्रदेशों के संकलन का मुद्रण
6.	उपस्कर एवं कलपुर्जों के मौजूदा दर भाड़ा एवं अंतरण मूल्य संदर्शिका का हिन्दी अनुवाद
7.	Foundation and Treatment of some important Dams (India)
8.	Bhagirath (English) - 4 Nos.
9.	Bhagirath (Hindi) – 2 Nos.
10.	Rules and Syllabus for 39th Departmental Examination of Engineering Officers of CWC
11.	Guidelines for preparation of Detailed Report of Irrigation & Multipurpose Projects- Report of Working Group
12.	Performance Evaluation Study of Gandipalem Project (A.P)
13.	Draft Purchase Manual and Tender Document for CWC
14.	Document of Technical Specification pertaining to Mongra Barrage Project (Chattisgarh)
15.	Integrated Hydrological Data Book
16.	Pricing of Water in Public System in India
17.	Pamphlet: Drop Irrigation
18.	जल की बचत के लिए ड्रिपसिंचाई – पैम्फलेट
19.	Expenditure & Employment Statistics in Major & Medium Irrigation Project (under construction)
20.	Water Resources in India at a glance- Booklet
21.	सिंचाई आयोजन में मृदा सर्वेक्षण का महत्व
22.	Folder related to WISDOM website for Data Dissemination
23.	Codes- Indian Standard Hydraulic Dams- High Degree overflow spillway
24.	Technical Specification / schedule for Barrage stoppage of Mongra Barrage Project
25.	CWC- Annual Report 2003-04 (English Version)
26.	Water Related Statistics

18.2 Microfilming

With a view to preserve important drawings and other documents for future references, the microfilming unit of TD Directorate records documents in microfilms after proper indexing and

coding. During the year 2004-05, nearly 825 number of engineering drawings/ documents were microfilmed.

18.3 Journals

TD Directorate of CWC publishes several technical and semi-technical journals and publications in the field of Water Resources development. 'Bhagirath' a quarterly semi-technical journal, both in English and in Hindi were published separately during the year. In addition, `Administrative News Bulletin' on monthly basis was also published during the year 2004-05.

18.4 Technical Publications:

A comprehensive report entitled "Water Resources Development in Cauvery Basin-Historical background, present status and future road map" is under preparation.

18.5 Publicity and Mass Awareness

Publicity & Mass Awareness programmes on water were arranged/ prepared and broadcasted over AIR/ TV in the form of talks & interviews etc. as a part of World Water Day and Water Resources Day's Special Programme. Pamphlets on various topics with focus on Water Conservation were prepared and distributed in various exhibitions. In continuation of Fresh Water Year Activities, a comic book – "The story of Water" was published and distributed in IITF, 2004 & the same is also being distributed to various other institutes.

18.5.1 Media Plan 2004-05 of MoWR

As per Media Plan 2004-05 of MOWR, CWC participated in the following Exhibitions along with other departments of MOWR:

- IITF 2004 at Pragati Maidan, New Delhi from 14.11.2004 to 27.11.2004 and was judged best in Silver category.
- Kolkata Utsav Festival at Kolkata Maidan, from 19.12.2004 to 03.01.2005 and honoured with 1st prize for pavilion.
- Municipalika 4th International Exhibition on Public Works, Municipal Service, Pragati Maidan, New Delhi from 03.03.2005 to 05.03.2005.

Besides above CWC also participated in /organised the following events:

- Simhastha Kumbh Fair 2004 at Ujjain during 05.04.2004 to 04.05.2005 with NCA and other agencies.
- Painting competition organised at Kalindi Bhawan for school children on 19.04.2004.
- Audio-Visual show was organised at Tamil Sangam Auditorium, New Delhi and one exhibition was put on the eve of Water Resources Day on 27.04.2004.
- Water Harvesting for Heart Care Foundation (Science & Technology) Qutub Institutional Area, New Delhi on 27.02.2005 to 02.03.2005.

18.6.2 Engineering Museum

Central Water Commission is maintaining an Engineering Museum at B-5, Kalindi Bhawan, Qutub Institutional Area, New Delhi-16, which is fully devoted to water resources development in the country. Various aspects of the development in the field of water resources in India are illustrated through self-explanatory working models. The museum is visited by a large number of visitors, which include students, professionals and people from all walks of life.

Ban Sagar Dam

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